



AG SECTOR COUNCIL | DISCUSSION SERIES

## BUILDING LINKAGES IN AGRICULTURAL EDUCATION AND TRAINING THROUGH SYSTEMS THINKING

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AUDIO TRANSCRIPT

FEBRUARY 17, 2016

This document was produced for review by the United States Agency for International Development. It was prepared by the Feed the Future Knowledge-Driven Agricultural Development (KDAD) project. The views expressed are those of the author and do not represent the views of the United States Agency for International Development or the United States Government.

## PRESENTERS

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Mr. Seth Heinert, Indigenous Education Foundation of Tanzania

*Laura Ostenso:*

We welcome everyone here. We're really happy to have the Innovation for Agricultural Training and Education Project, or InnovATE, with us for this February 2016 Ag Sector Council. InnovATE promotes USAID investment in human and institutional capacity building that supports the US government's Feed the Future Food Security Initiative. Our focus today is on agricultural education and training within a systems approach. InnovATE is working with Agrilinks to advance the discussion on important areas of agricultural education. This is part of a series that we've been doing. And so we look forward to a great presentation and discussion today.

*Clara Cohen:*

Good morning, everyone, and welcome. It's great to see everybody here, and also thanks very much to all of you who tuned in this morning online or this afternoon online, depending on where you are. I also want to thank Laura Ostenso for all of her work in helping to pull together this seminar today.

My name is Clara Cohen, and I'm from USAID's Bureau for Food Security, and I'm the project manager for the Innovation for Agricultural Training and Education Project. And I want to make some remarks, both as an introduction to the speakers, but also as a call to action, briefly framing why agricultural education and training is important in the context of the Feed the Future Initiative. And I'd like to put in a plug for the ongoing series of agricultural education-related topics on Agrilinks, including gender, pedagogy and curriculum reform, workforce development, and youth development. And I hope that all of you will find time to participate in some of these events.

So if there's one message that I hope you'll take away from today's seminar, I hope it will be that we're – if we're serious about sustaining the results being achieved through agricultural development investments, we absolutely need to pay attention to agricultural education, because of its critical role in supplying and preparing a skilled, capable, workforce that will ensure that institutions across the sector are resilient and perform effectively.

Today's speakers will be emphasizing the importance of thinking about AET as a system, and exploring the linkages among the elements of that system. One of the biggest challenges in AET to underscore is that there are not enough in-country sector linkages with stakeholders. We need to turn those stakeholders into partners and active champions or supporters of AET. And we also need to have a collective vision for AET system reform. This is a reform that would involve more relevant curriculum and pedagogy, inquiry and science-based approaches, and more connectivity to the private sector and to other end users.

Educational reform is critical for competitiveness in an increasingly knowledge-based global economy. Critical thinking, problem solving, and entrepreneurship skills directly translate into more vibrant agricultural innovation, which in turn will drive productivity gains, economic growth, new market creation, and employment. And this same skills set is needed to respond to challenges, like environmental degradation, climate change, and resource scarcity.

So we should all be thinking about how agricultural education relates to our programming, and we should be asking questions like what skills are needed to meet our objectives and what is – what are the pathways for delivering those skills? Does the supply of skills match the labor market demand? How does the full range of agricultural education and training institutions at the primary, secondary, vocational, and technical levels, and higher levels, as well as non-formal and informal education, help to develop a workforce pipeline with the right kinds of skills to make the agricultural sector perform effectively? And how do we create jobs to support emerging enterprises?

I wanted to give a short shout out to some of the small handful of our field missions who have done pioneering work in this area of agricultural education capacity development, field missions like Egypt, Senegal, Tanzania, Guinea, Kenya, and Liberia. And we should all be taking notes of these models and emulating these successes. However, there is still much that we don't yet know about the best ways to support AET system development, and that is the context in which the InnovATE Project was developed. It was developed as a platform to pull together what we know about what works and what doesn't work in agricultural education capacity development, and as a mechanism to respond to our field missions to conduct analysis on the agricultural education landscape, and to inform programming design at the country level.

So the project over its existence has pulled together a large body of analytical work on such topics as curriculum modernization, pedagogy reform, reducing barriers to women and girls in agricultural education, entrepreneurship education, youth engagement, agricultural education in post-conflict settings, and many others. It has also done landscape level AET analysis in close to a dozen countries, and is helping several countries with agricultural education capacity development implementation.

So with that introductory context, I'm really pleased to welcome our speakers today. In person, we have Dr. Grady Roberts, T. Grady Roberts, who is a professor in the Department of Agricultural Education and Communications, as well as executive director for the Global Education Lab, at the University of Florida.

And joining us online are Mr. Seth Heinert, who serves on the board of directors for the Indigenous Education Foundation of Tanzania, where he works on youth issues. I want to extend a warm welcome to all of you, and we are looking forward to a great discussion. Thanks very much.

*T. Grady Roberts:*

Good morning, everybody. It's my pleasure to be with you today to share a few thoughts on this issue. I'll begin by saying that the things that I'm going to present today are by no means *[audio glitch]*. I will share that my comments this morning are based on several sources of information. One, in my current role as a professor of agricultural education at the University of Florida *[audio glitch]*, but then secondly on my own personal experiences *[audio glitch]*, and then over my time working *[audio glitch]*.

So when we were originally approached about doing an Agrilinks seminar on ag education and training, I first started thinking about what might be most relevant to people like yourselves, that are interested in the topic. Now those of you that know a little bit about adult learning theory know that adults come to a learning environment for a very specific purpose. Well, I'm at a little bit of a disadvantage, in that I don't understand why all of you are here today, and so I'm going to do my best to try to meet your needs.

One of the things I'm going to try to do in this seminar, to allow some personalization of this experience, is instead of saving all the question periods till the end, we're going to pause periodically throughout the seminar, and so if you've got a specific question, both in person and online, then we'll be able to take a few questions. So again, thanks for inviting me, and I'm glad to be here.

So some of you have probably seen this drawing before, but we've got, what, six different blindfolded people examining this elephant, and based on their own individual perspectives, they're making all sort of guesses about what is this phenomenon that they're interacting with. And I thought this was an appropriate way to think about ag education and training systems, is that depending on which piece of the system you're looking at, you might get a very different picture as to what this beast is.

Well, if we want to look at the whole thing, to make a big impact, we've got to take into account all perspectives. And so each of these people through their own lens is making an impact, but collectively if they can combine what they were seeing, it would be a much more holistic picture. That's really my challenge with you all today, is to start thinking about ag education and training as a much broader perspective, and looking at all the different *[audio glitch]*.

The other thing I want to draw your attention to is that everyone's an expert, right? So Linda Darling-Hammond out at Stanford coined this term apprenticeship of observation. Most of us participating in this seminar have a fairly high amount of education. I just took some guesses on the number of years for different kinds of degrees. Your personal experience might be a little bit different. But collectively, you have a lot of experience as a student within an educational system, and that gives you some perspective as to what an educational system is.

But sitting in an educational institution as a student only gives you a small window as to what is the entire system. And so as you start trying to make changes in institutions, it's important to invite the right set of people to the table to get that bigger picture of what is an educational institution.

So I'm going to propose talking through a few things today. One, that AET is a system, and as a system, it has lots of different parts of it. And so I'm going to talk specifically today about five different linkages within the system, and then our two online experts, Drs. Ganpat and Heinert, will shed some personal perspective on these linkages from their own personal experience.

But the first is the linkage between theoretical and practical instruction. That's more of an internal linkage within an institution. Second is between AET and industry. Third, different levels of AET. The fourth, different types of institutions. And then finally, AET and extension services.

So my take home message is that if you only look at one piece of the system, you're not going to have the impact that you want, or at least, you're not going to have the sustainable impact that you *[audio glitch]*.

For those of you that aren't familiar with the concept of systems thinking, the central piece of information about systems thinking is that any organism, whether it be plant, animal, or logical system, is composed of interconnected parts. And so the interconnectedness is a very important part of thinking about things from a systems perspective. And so if we think about AET, it's about technical schools, about secondary schools, primary schools, extension, higher education, government, and so forth. So it's all about all these different pieces and interconnectedness between them.

Now what we may not consider is that making a tweak in one part of the system will probably have implications to what happens in other parts of the system. But we're focusing our efforts on higher education, and doing some capacity building work in higher

education, there are probably ripple effects to other parts of the system that may or may not be there.

So to give you a biological example of a system is us. We're systems, right? So we – our bodies are composed of all these different systems that interact together. They don't operate independently, although the medical specialists that we see might like to only focus on one of those areas. But we do know that if we make adjustments to our respiratory system, that's going to have implications on other parts of our body as well. So I think education training is similar in that – again, having impacts on one can have impacts on the other. And so I'm going to really talk today about some of those linkages and those interactions between those.

And what my personal experience has been is that those linkages, more often than not, are not as functional as they could or should be.

I'll give you a little bit of background. Again, I don't know all the personal knowledge in this area that some of you may have. But AET systems are typically broken down between formal and non-formal educational institutions, and formal education institutions can loosely be thought of as primary, secondary, post-secondary, and university institutions. And then non-formal education institutions, extensions, NGOs *[audio glitch]*.

And here is a nice model that our folks at InnovATE put together. It kind of captures some of the breadth of all of this. If you notice, in the top part of this model that the formal education that the formal education sits. At the very bottom you have informal education, that day to day learning, and then on the right hand side of the blue, you see non-formal education in terms of extension and NGOs. But all these things interact to meet the needs of the labor market and value chain *[audio glitch]*.

That is kind of the background information. I suspect some of you are probably pretty aware of this. Those of you that aren't, I'm hoping this gives you at least a platform of where we're going to begin our session today on *[audio glitch]*.

So the first linkage that I'm going to propose as very important today is a linkage within an institution, and that's the linkage between theory and practice. And this is kind of a pet peeve of mine, which is why I chose to focus on this one first. And even in this country, the United States, we don't always do a very good job of this. But it's about linking the theoretical instruction that happens with the practical instruction that happens. And it's often operationalized as classroom instruction being very theoretical, and then laboratory or field instruction being very practical. In a perfect world, those are

linked very well together. My personal observations have been that more often than not, those are not linked very well together, some not very well at all.

So one of the first things that needs to be considered in trying to build this linkage is if an educational institution is going to provide hands on learning experiences and labs, they've got to have the appropriate facilities to be able to do so. So laboratories, greenhouses, fields for crop production, food processing, you name it. They've got to have the appropriate facilities, and those facilities have to be up to industry standards. If we're going to be training the generation of the workforce, we don't need to be teaching them in outdated or antiquated facilities that they're going to have to go back and relearn when they enter the workforce.

So some considerations is that – as we think about donors and other considerations for helping build the linkages, oftentimes, an institution needs to have some initial construction of these facilities. these laboratory facilities [audio glitch] so we need to have appropriate investment. Once those facilities are in place, there also needs to be [audio glitch] invested in maintaining and updating those facilities. Modernization as well, so as the technologies change, and [audio glitch], so again, one of the first linkages is having the appropriate facilities.

The second thing is you've got to have personnel capable of using those facilities. That includes both instructional staff who will be teaching in those facilities, and it also includes the management staff that's going to day to day oversee those, and perhaps in some institutions that could be the same person. But if it's a larger institution, you're probably going to have some staff level management people overseeing the day to day stuff, and then the instructional staff will come in.

One consideration to make is that oftentimes, the instructional staff may not have been taught in a way that they have firsthand experience in hands-on teaching. And so, they've got to be taught how to teach in labs and so forth, or they're not going to be able to do it very well, because if they're lecturing in a lecture hall and then they take their class out to the greenhouse and they're just lecturing in the greenhouse, then the greenhouse is really not serving its purpose. They've got to be taught how to appropriately use those kind of facilities. So there's opportunities for capacity building for instruction staff to teach hands-on.

Related to gender is in some cultures males and females have different roles, and the types of activities that can be appropriate for girls and boys might be different. So if it's not customary for girls to

do hands on labor, then there might be some problems in implementing hands on teaching. That must be considered country by country and situation by situation, to provide appropriate experiences for both the boys and girls.

Here's the piece that I think is the most important, is coordination between the theoretical and practical instruction. In a perfect world, the same instructor would be teaching in the lecture part and also teaching in the hands on part, so that there is a direct connection between what's going on in the classroom and what's going on in the lab to get that practical instruction. That's a perfect world. In a lot of places that is not what's happening. There's one person teaching lecture. There's a totally different person teaching the lab hands on piece, and the level of coordination between those two is probably not what it should be, and in some cases, I've actually had people share with me that they go to – this is coming from students – they go to the lecture, the professor teaches about this, they go to the lab, and the lab instructor disagrees with what the professor taught, so they reteach everything in the lab, and that's a waste of effort. And so that needs to be better coordinated.

So there needs to be some efforts for coordination between whoever is teaching those two things. And so that's one other opportunity for some capacity building efforts, is to teach people how to coordinate.

Of course, in agricultural, the other limiting factor is, depending on the climate zones that we're in, agricultural production cycles can greatly impact what we're able to do and when we're able to do it. And so depending on what the concept is we're trying to teach, there might be a particular time of year that kind of necessitates that that's when we teach that, because that's when the growing cycle is.

So those are my perspectives. And so now we're going to shift over to Mr. Seth Heinert, who's worked at a school in Tanzania, and he is going to share some of his personal experiences about linking theory and practice. So Seth, all yours.

*Seth Heinert:*

Good morning, everybody. I would like to share with you about my experience teaching at Orkeeswa School, and how we linked theory and practice there. Orkeeswa, first of all, I taught agricultural education at Orkeeswa for three years, from 2010 to 2013. Orkeeswa is a private day school situated in a rural community of a village in Northern Tanzania, kind of generally between Mount Kilimanjaro and Serengeti, for those of you that are familiar with those landmarks. We teach the government curriculum there.

Tanzania has an exam-based system, so in forms two, four, and six, students take these high stakes exams. The mission of the

organization that's funded, it's funded by a nonprofit here in the US, is through highest quality holistic education, we equip youth to become leaders in their community. So ultimately, what we're looking for is community transformation through youth. So how does agricultural education fit into that?

We taught the government curriculum, and I had a syllabus that guided me on what to teach for agricultural, but we wanted to make the theoretical knowledge that we're learning in agricultural more practical. So basically, we built a school garden, school agricultural facility.

The school syllabus was divided up into five sections: plants, animals, soil, mechanics, and agribusiness, and so we established facilities that connected to that. For example, in the garden, we were better able to teach soil, seeds, and agronomic practices, and it also served as a place for students to conduct their own research. We also put in a goat barn, beehives, and chicken coop, because all of those connected to the animal and agribusiness portion of the syllabus. So learning went from being this rote memorization to far more practical and I think deeper for the students.

Secondly, we introduced a student-based entrepreneurship program, where students were able to take knowledge that they learned in the classroom and apply it in their own personal project that was income-generating. By virtue of its location, most of those student projects were agriculturally based. So those are two examples of how we were able to connect theory into practice there at the school.

*T. Grady Roberts:*

All right. Thank you, Seth, and we'll hear more about – more from Seth again throughout the presentation. And so now is going to be our first intermission, and so I have a question up here, but I'll first defer to you guys in the audience and online, if there's a question at this point about what we've talked to – talked about up to this far.

*Audience:*

I just have a detail type question. You categorized tertiary education as being separate from university education. I always think of university education as being part of tertiary education. Is there some reason why you separated them out?

*T. Grady Roberts:*

Yeah, a lot of people do classify them the way that you do, and it could be thought of as an entire umbrella. My point in trying to do that was to differentiate between maybe a two year diploma program at a post-secondary school versus a baccalaureate or higher in grad school, but your point is well taken.

*Audience:*

My name is Paul Cook and I am an independent consultant in Washington D.C. and my question has to do with the specifics about

the general quality of facilities related to the qualities that are expected in industry...

*T. Grady Roberts:* Yeah.

*Audience:* ...Do you teach what is expected in the industry, or are you introducing technology with the expectation that they will take it into industry?

*T. Grady Roberts:* Yeah, you raise a good point, and it's kind of the chicken and the egg question, is do you teach students with what's acceptable now, or do you teach students with what the next generation of the technology should be? And you could argue that both ways. My personal opinion is that we don't want to set the bar too high, because if you go with too new of a technology, then they're going to get out into the workforce and say, well, I don't have this that I had at school, so I can't do it. And so it's kind of a balancing act between how new do you go, and of course, in lots of places, educational institutions are bureaucratic institutions and slow to evolve anyway. And so staying ahead of everyone else is not something that we in education are very good at. I like to say that we move at glacial speed in terms of educational reform. But that's a good question.

I would say that we certainly want to meet the level that most of the industry is at the moment, but be looking for opportunities to introduce new things. And of course, these facilities and then the equipment that goes in these facilities is a pretty big investment. Educational institutions probably don't have the budget to change as quickly as the industry is going to be able to change. And so it's constantly a thing. We're actually in the next linkage going to talk about the linkages between industry and ag education, which is one mechanism to work through some of that.

*[Webinar Facilitator]:* There's a question from Martha, and her question is sort of getting at practical in terms of the market changing. How do you ensure that there is a practical response to the market as it evolves?\_\_\_\_\_?

*T. Grady Roberts:* That's actually an excellent question. The second linkage linking between industry and ag education and training is one mechanism to make that happen. And it's that the instructors and curriculum designers in the educational institutions have to be aware of what's going on in the workforce and in the industry to be able to make what they're teaching relevant. So that's an excellent question. And some institutions are very well – do that very well. Other institutions struggle with that considerably. Thank you.

So our second linkage is linking AET and industry, and I will begin by making an assumption – you may or may not agree with me, but I

was trained as a vocational teacher, and so my assumption is that our educational programs are designed to meet workforce needs. That's the purpose of why we have these institutions, why we pay these instructors, why we build these facilities. It's to meet the needs of the workforce. And by definition, then, there should be a linkage between ag education and training institutions and the workforce.

And so I want to highlight three ways that I think this linkage can really support and enhance what we're doing in AET. The first is about supply and demand, and I'll emphasize and break these apart a little bit more. The second is about curriculum relevance. And the third is about field experience and internships.

As we think about AET and the output of AET being students, there are many different levels of employment within an education – or within a particular workforce. And so from the very unskilled all the way up to the professional level, and different models break this apart differently, but the key point is that yes, we need unskilled field labor in agricultural, but we also need the most skilled scientific researchers solving the next generation of problems, and we need things in between.

So one of my questions to ask is within a given country, do we really have a good handle on what is the supply and the demand for workers at these different levels? My guess is probably not. Some countries, we probably have a little bit better understanding than others, but in a lot of places, we probably really don't understand what the needs of the industry are. And so that might be one place to begin some of our efforts, is really getting a good sense of what the situation is before we start trying to depict it.

Here's another model of ag education and training, looking at how it positions itself within the industry. This is a version of a pipeline model. I'm not the biggest fan of pipeline models, but I think this does communicate some different things.

And so at the very left side of the model, we have unskilled labor, and after progressing through primary school, they might have some basic skills, to lower secondary, a few more skills, and either general secondary or vocational, some more skills, all the way to tertiary education, to the highest level of skill. Now what I think that this model does not do well is account for the learning that takes place outside of an education institution, and so that needs to be considered as well.

Here is a model, and it's probably difficult for you guys in the room to read this, but online, on the computer screen, they'll probably see it a little bit better. This is a model that was done in the United States

for our secondary vocational agriculture programs, and it's what's called a career pathways model. And they did some work to break down different pathways within agricultural. So if you notice, on the outside ring of this model, we've got plant systems, power systems, agribusiness systems, animal systems, biotechnology, and so forth, so they figured out what are the career opportunities for students, and then based on that, they built inward to develop standards for content, clusters, and then specific standards.

And so it was kind of an outside-in model, where they figure out where is the end product that we need? We need skilled workers in these different areas. Now let's develop a curriculum that can help students reach those needs.

So another consideration is in a given country have people map a system to see what are the needs, what is the demand for people? Do we need lots of students trained in plant systems, and we need students trained in animal systems, in biotechnology, or whatever the case may be. And so again, doing our groundwork within a country to better provide the opportunity to create curriculum that's actually meeting the needs of industry.

So the second part of this linkage is the relevancy of the curriculum. My experience has been in most countries there's a government-mandated curriculum that was created at some point in probably the distant past, and schools are obligated to teach from that curriculum, and there's probably some level of testing at different points within the progression through the educational institution.

The big question is is that curriculum relevant to what the industry needs, what the students need, and so some mechanisms that can be put into place to make sure that that curriculum is relevant would be some kind of an advisory committee made up of business and industry representatives that could provide feedback to the institutions relevant to the content that they are teaching. There should be some mechanism for some periodic reexamination of the curriculum. So just because some government committee put the curriculum together 25 years ago doesn't mean that it's necessarily relevant today, so there ought to be some sort of systematic review of the curriculum.

And there should be some periodic professional development for the people that are being asked to teach the curriculum. As you guys know, agricultural is a very broad field, and preparing a teacher to teach all aspects of agricultural is very problematic. So teachers often leave educational institutions with baseline knowledge, and so they're going to need some further professional development to get their skills up relevant to the specific things that they need to teach.

Now the big consideration is most education institutions fall underneath the industry of education, which is a big bureaucracy, and again, change within that system is often very slow and can be very problematic. And so there needs to be some intervention in trying to help with that bureaucratic process. So that's another thing that donors can do, is working at that kind of policy level in the ministry of education or whatever ministry might be involved in facilitating ag education training.

The third part of this linkage, and this is where I think – answers some of the questions that we had earlier, is the opportunity for field experiences and internships. Earlier, we discussed that it can be challenging and problematic to make sure that the facilities within a school are always up to the level of where the industry's at, and to be honest, it's probably not going to happen. They might be up to date the day you open those facilities, but two, three, four years later, they're not going to be quite up to industry.

Where you can make a difference for students is providing some field experiences and internships for students actually working in industry. And so if the educational institution has built the appropriate linkages with employers in the respective area, that provides the opportunities for students to go out and gain firsthand experience in an actual work environment using whatever technologies that particular workforce is using.

So there's short term experiences, long term experiences. Kind of like a sideline tangible benefit of this is if I'm an instructor at a technical school and my students are working at a local food processor, and I interact with that food process, I'm probably better aware of what's happening in the industry; thus, what I teach back on campus is probably more relevant as well. So it's kind of a mutual benefit.

Now one of the key things to think about is that requires building relationships between people that work within the educational institution and people working in the industry. And there has to be mutual benefits for participating in that relationship. As the employer, hopefully, that means that I'm going to have better prepared graduates to hire to come work for me, and so maybe that's a tangible benefit for me as an employer. But as the education institution, then I have the opportunity to see what's happening in the industry, and also to provide better experiences for my students.

Now considering gender is, as we know, in different cultures, different types of jobs or responsibilities are open to boys and girls, men and women. And so as we think about trying to implement projects like this, and in programs like this, we've got to take into

account what is acceptable and appropriate in the local environment.

Kind of a side story, I'm involved in a project that I won't mention by name, but part of what is involved in this project is to do – bring ladies to the U.S. for higher education degrees, which sounds like a very worthy cause, and I agree that it is a very worthy cause. But we're still early on, and we're scratching our heads a little bit, because as we're interacting with the folks at the universities, we're looking around, and almost every person working at the university is men.

And so we're thinking about, okay, if we invest in these young ladies to get higher education degrees, if they can't go back and get a job to use the skills that we gave them, is it a good investment? And I don't know the answer to that. We're kind of still struggling with that one on our own. But it is something to consider, as we're trying to do development work.

Now, Laura, we'll take a question or two from the audience and online.

*[Webinar Facilitator]:* This is a question from earlier on, a good question that I wanted to put out there. It's from John, and it's for you, Dr. Roberts. And he said that we can't overemphasize the importance of the systems perspective. But in observation on the human systems model, it assumes that the system is self-contained, whereas AET is less bounded. Do you have any thoughts on how to understand and/or measure impact in relatively uncoordinated systems such as AET?

*T. Grady Roberts:* That's the million dollar question. I wish I did have the answer to that one. But in some regards, conceptually, most AET systems are bound by lines that politicians draw on a map, theoretically, although in some cases, there are international collaborations between institutions.

But yeah, so that's – in my opinion, although the mapping a system, an AET system, will be an ongoing process, if you want to make holistic change and long term impactful change in an AET system within a given country, one of the first steps should be kind of mapping the systems, so you know what the heck is going on, because it's hard to – it's hard to really make systemic change if you don't understand the system that you're trying to work with.

But again, it's not a static system, either. It's a dynamic system. And so even though today you might have a good handle on what's happening, a week from now, a year from now, ten years from now, it's probably different than what you did. And so it's – to say that you ever have the complete answer would be false. But I think it's an important thing to do to kind of gain a good understanding of what

the current status of the system is. I've got one of my graduate students now that we're going to try to map the AET system in Haiti, and it's turning out to be a pretty large task to do, even in a small country like Haiti. And so we'll see how that turns out, but that's an excellent point. Other questions?

*Audience:*

James with Crown Agents. My question, and we may get to this later, is the link that's between international research and the somewhat very independent educational institutions and systems. The reason I bring this up is the fact that 70 percent of the germplasm use the United States actually comes from overseas, and so I'm wondering thought it's take it to another step of complexity, but at the same time, how do we get outside of our isolated...

*T. Grady Roberts:*

Yeah. You raise a good point, and I'm not going to quite go there in this lecture. I was thinking more at the national level, stopping at the national level, but you're right, that feeding the 9.6 billion people or whatever the current estimate is in 2050 or whatever, all those slogans that they say, is going to be beyond just one nation. It's going to require international linkages and collaboration. And I – for the scientific researchers at the advanced level, presumably through the professional societies and the empirical literature, that there are some of those linkages being made, and you probably all know personal examples of where that's not done very well.

There are a handful of universities that are more international in scope. Earth University and --- University might be two examples. University of West Indies is a decent example as well, although they're primarily Trinidad and Tobago, but they reach the whole Caribbean region.

So yeah, I think that there are opportunities for bringing together experts on a much broader level, and I think there are opportunities for projects like InnovATE and other HICD projects to leverage resources to bring experts from a lot of different places together to do that. But your point about the research is well-taken. And particularly, I know that some of the lesser developed countries have challenges sending their scientists to appropriate meetings to share and disseminate. CGI centers are doing some of that work as well. Others?

*[Webinar Facilitator]:*

We have a good conversation going on on the webinar. This is a question from Clarice, and her question is a comment that you made, I believe, Dr. Roberts, that the link to industry presupposes that there is a real industry in the country. However, oftentimes, in the development context, many farmers are self-employed in small scale. So how do you create links with industry then, and how do you ensure that your students can go into the field?

*T. Grady Roberts:*

Excellent question. And of course, if we're working under the assumption that the graduates of the institution will be employed, even at a farm level, we're implying that it's not the poor farmer, that it's a farmer with some level of means to provide some employment, or perhaps the student can go back and be a farmer himself or herself, and that raises a good point.

I think in many countries there are good examples of farmer associations through some kind of a cooperative or a network or some kind. They can facilitate some of those interactions. But then there's always the input side, the input supplier side, where there's going to be opportunities for graduates.

And then truthfully, the technology school and the university level graduates oftentimes go to work for the government through an extension or in some kind of an advisory role, and so there are opportunities there as well. Good question.

Looking at the time, we're having great discussion, but we are moving a little bit slower than I had anticipated. So I've got three more linkages to share with you. I'm going to speed it up just a little bit, because I think that the question part, that's where you get to personalize this experience for you, is the most important, and so I'll quickly present some comments, and then we'll take some questions.

So the next linkage, in my opinion, is linking AET at different levels. And so these are the UNESCO education levels. Typically in AET systems, we're thinking about secondary, diploma level, baccalaureate level, and then graduate school level, and linking all those different institutions together. You'd think that might be somewhat simplistic, because oftentimes, they're housed under the same ministry, the ministry of education, but in practice, there might be different parts of different – in the ministry, and so the secondary schools might act autonomous from the university, and so forth and so on.

But I would argue if we want to think about improving food security in the country, that we need to have all the different levels of AET interacting together, because in theory, students matriculate from one level to the next level, to the next level, and to the next level. And so if there aren't linkages between the institutions, what's being taught in the curriculum at one level may not be applicable or prepare them for the next level, and so forth.

And so curriculum alignment would be one opportunity to do that, and I think that's something that donors can participate in. Again, if we map the AET system, the next thing to do would be to lay out the curriculum and see where are there gaps and where are there

overlaps. If we have limited resources, overlaps are a big problem, because we're wasting resources on reaching things that have already been taught at a lower level.

There are also opportunities for preparing instructional staff. Now in theory, the graduates of the higher level of AET institutions are probably the instructors at the lower levels of AET institutions, so we'd think there'd be some sort of linkage, but my personal experiences have been that the formal linkages oftentimes do not exist between different levels of AET institutions. If there are interactions, they're more on an informal level. So people know people socially, and so they interact socially and informally, but through formal interactions in terms of job performance, those linkages may not be there.

It's even more problematic if there are multiple ministries involved. So maybe if the vocational schools are under a different ministry than the secondary schools, that might be under a different ministry than the higher education, and so forth and so on, that makes it even more problematic to do that. But I do think that there are opportunities for projects like InnovATE and other government supported projects to facilitate interactions between different levels of institutions.

Going back to thinking about gender and how gender plays in this role as well, and that we know in many places males and females do not have the same educational opportunities. And so what can be done to facilitate access to education?

So now we'll hear back from Mr. Heinert about his experiences at the Orkeeswa School.

*Seth Heinert:*

Yeah, I wanted to talk just briefly about how Orkeeswa built in systems to matriculate students to higher education, specifically to skilled professional positions. Just to give a little bit more background, Orkeeswa was established in 2005. We serve about 250 students in forms one through six. Fifty-one percent of those are female, so the area is primarily Maasai. If you know the Maasai tribe, they are not real high on girls' education, so we were pretty proud that we've been able to incorporate so many females into our education. And I've found that about that same number were in my agricultural classes as well.

I wanted to address some of the practical things that we did there at the school, as well, such as electing agricultural leaders were ways that we tried to empower some of the students, because in addition to head knowledge, we wanted students to, I don't know, like agricultural and want to have a future in that as well, too.

Tanzania has a very exam-based British system, like I said before. So forms two and four were big jumping off points for students. They were required to take – in their first two years to take agricultural in forms one and two. They weren't required to take it in forms three and four. So we had some dropout between form two and three, and then we didn't offer agricultural in advanced level, forms five and six. So that gives you a little bit of an idea of how we approached it at Orkeeswa.

We did have one student that was interested in agricultural, and so we partnered with another secondary school for him to continue on with his advanced studies. But the long and the short of it is that by and large, students were interested in science type of subjects. They weren't necessarily interested specifically in agricultural. So that was kind of an attitude shift that we're working on with students, in addition to providing a system that went along with making it possible for them to move on.

Our goal with the students would be heading on to university once they got finished up. By and large, students have done very well on their exams from the school, but they've been in more science type of subjects. So one of the ways that we've been able to work with institutions are to try to provide certificate programs for students that terminate in their form four year. That took some real active guidance on the part of the school in order to, first of all, identify what the programs were, then put the students in touch with the right people that are there.

And I think if I have an overarching point to that, it's that the school can take a real active role in helping students find the right level of higher education, and then also linking them to industry. We can't just assume that students are going to leave and know how to navigate those waters. And I think that was one of the things that – structurally that we were able to build in.

*T. Grady Roberts:*

Perfect. Thank you, Seth. So now time for another question or two from the audience or online.

*[Webinar Facilitator]:*

So we have a good question from earlier, from online. This is from Andrew, and it's about the linkage between public sector extension systems and the private sector. His question is what role for private sector in delivering extension training and links to public sector and training methods best reach producers? And then we had a comment that just came in from John that I thought tied into this question, and wanted to share with the in-room audience. He gave an example of some of his work in Jamaica, and he said that rather than just focusing on onion and pepper production in farmer field schools, they brought pepper and onion buyers to discuss quality, size, and

market expectations, as well as the input salesmen on how to use the products properly to participate in the Farmer Field School sessions, to contribute to farmer learning while making business connections. So I'd be interested in hearing more of your thoughts on this.

*T. Grady Roberts:* Yeah. That's a great example of linkages. So you've got public sector mentioned, you've got people providing non-formal education who aren't working for the government, you've got input suppliers, which are often a major source of information for producers, all collaborating. And so somewhere, someone had to have the relationship built and the linkages built to pull that group of people together. So I think that's a great example of some of the examples that I'm trying to highlight. And we're going to talk more about linking extension to AET a little bit later, which kind of relates to that question. That's a good example. Thank you.

*Audience:* This is an example from the Caribbean. There was a small scale organic farmer. They actually converted this farm into a training center. And at a certain point, there needed to be linkages with the formal educational system. But his became a very successful self-sustaining training institute.

*T. Grady Roberts:* Yeah.

*Audience:* But more informal than formal.

*T. Grady Roberts:* True. And I suspect that he probably has some informal linkages with some of the instructors at the institutions. Especially small countries, people all tend to know everybody anyway. But there are opportunities, and going back to the curriculum, what's being – what is he teaching on his teaching farm versus what's being taught at the university or at the technical schools? And then obviously, there is a demand or at least a perceived demand on his part to provide this service, which has implications for what's happening at the educational institution. So that's good example.

*Audience:* Going to what you said at the beginning how you were working in a project [inaudible]... I'm wondering, could there be negotiations with the host country governments to have some quotas to have spots for women in the universities? I work for AID, I am a Desk Officer for some African Countries, and the parliaments in many countries quotas for women, and the space is there, and I'm wondering if the government has state sponsored schools, couldn't there also be maybe some quotas for filling women in teaching positions there, because if they are investing in all this training, and then women get discriminated against back home, it's – we're not getting our return on investment. But if we're working with countries that are familiar

with quota systems and believe in woman's empowerment, it seems like it could be negotiated better.

*T. Grady Roberts:*

Yeah. I mean, it certainly could, but that's my point in bringing up that example, was if we've not really looked at the system ahead of time and we're just trying to do this intervention without thinking about the bigger implications, then the impacts may not be as big as they could be, whereas if we were looking at the system, and we're still early on in our conversation on that particular project, but looking at the system and getting an idea of are quotas plausible in that given situation, do they exist, and so forth, that's the – it goes back to the highlight of kind of mapping the system to see what is in place, both in terms of the types of institutions, the number of students, the gender of the students, the curriculum, and so forth. But it further highlights the complexity of it, and then as we've noted in the state run or the government run institutions, there is that other level of policy and bureaucracy that must be worked through to make changes in the institutions.

And that's where it can be challenging. If we get funded for a three year or five year project, big changes don't often happen in three years or five years. You've got to lay the groundwork, and you've got to have long term efforts at making those big changes. Good question. One more than we'll move on?

*Audience:*

Hi, I'm with Bureau for Food Security. And a question for Seth, and I guess for anybody, really, but Seth has described in Tanzania what is essentially the agricultural education model that we have in the US, with classroom instructions science instruction, the supervised experience and entrepreneurship, and then the soft skills of the leadership development and what they're doing there. That's what we do with Future Farmers of America... or what used to be called Future Farmers of America\_\_\_\_\_.

The US has been supported by legislation where we have invested in agricultural education, for 400 years, and so I'm just curious, to what degree do you think that kind of legislative support for agricultural [audio glitch]?

*Seth Heinert:*

The audio cut off at the end, but if I caught the gist of the question, it was to compare the Tanzanian education and legislation specific to what we have here in the US, with historical legislation, the Smith-Hues Act. Did I get the gist of the question?

*T. Grady Roberts:*

Yeah.

*Seth Heinert:*

Okay. Generally speaking, it's not similar. There are systems in place that have research institutions and agricultural, such as that in

Morogoro. We have school-based agricultural education in secondary schools, at the high school level, but the research that's happening in Morogoro doesn't necessarily link to what's happening in the high school system, and it doesn't necessarily link to what's happening in extension. It should, and I think to varying degrees it does, but it isn't necessarily as robust as what we have here in the US.

And then the third example that you talk about of the home-based entrepreneurship projects, or what we have here in the US with SAE or supervised agricultural experience programs, I would say that that's probably the piece that's missing the most. There are very few examples of that happening out there.

So the example that I gave of entrepreneurship going on at Orkeeswa, I think that's unique in the secondary system. You do read about some examples happening specifically in primary schools, and I think that's really encouraging, but to bring all three of those components together, what's happening in the classroom, what's happening in school land facilities, and kind of this hands on application, and what's happening in like connecting students through youth clubs or organizations, to bring those three components together isn't there, and in part I think because the historical legislation hasn't been in place in a country like Tanzania.

*T. Grady Roberts:*

Yeah. So I think Seth raises an interesting point, and it goes back to your question, is that perhaps one place that – once we understand a system and we understand some of the deficiencies in the system, then there could be efforts on behalf of the donor at that government policy level, since most schools are government run and obligated to follow those regulations, for some change at that level.

And that kind of feeds right into our next linkage. And what I'd like to do is I've got linkage four and linkage five that I'll kind of lump together, but we know that AET institutions, there are many different types of AET institutions run by many different kinds of organizations, some government, private, parochial, NGO, perhaps other different models. Further complicating is that some of these schools might teach in different languages. But if we're thinking about AET from a systems level perspective, it's important that we think about all of the players in the system, not just the government schools, or not just whatever. So we've got to think about linking those things together.

One thing to think about is the curriculum. They teach the similar curriculum. Seth shared his example in Tanzania, that they teach the state curriculum, but all non-government schools may not be obligated to teach that. Is there synergy or overlap in the programs? Do they – are they replicating services? Are some providing services

that aren't provided elsewhere, or providing instruction in areas that aren't provided elsewhere? One big thing could be the quality or at least the perceived quality of different institutions. Perhaps if it's a private institution, there might be a perception that the quality of instruction and the quality of the curriculum is higher than in the public schools. That may or may not be the case.

I think there is some opportunity for us working in AET development, is to create opportunities for interactions between different types of institutions, since ultimately, all the institutions are preparing people to enter into the workforce. So again, related to gender, do males and females have the same level of access? Maybe the elite private school is two hours by bus away from home. Maybe the families are more comfortable letting the boys go to that school and the girls stay local. That could be an example of how gender might impact some of the access issues.

We'll shift over, shift over. So our last linkage is between AET and extension. So if we go back to one of the models we looked at earlier, we know that education happens in many different settings, not just in formal education settings. And so the terms informal and non-formal get used in a lot of different ways, and you could argue one way or the other. But I'll at least explain how I'm using them today. I'm going to use informal education to describe just the life experiences that a person has living day to day, and what they learn on a day to day basis. I'm going to use non-formal education to talk about some planned educational activities often provided by an extension-like organization. And then formal education to be AET.

So we know that there are many different types of extension systems around the world, some run by the government, some private, pluralistic. Lots of different ways that extension-like organizations are providing education and training in agricultural.

We do know that one of the biggest challenges in a lot of countries is that the extension system is run by the ministry of agriculture, typically, and the education system is run by the ministry of education. And so there may not be direct linkages between those two, at least at a formal level. And so there's some opportunities for building those linkages. A great one would be that I suspect that in many countries, the extension officers are actually graduates of AET systems, and so that informal network already exists, because they went to school at an AET institution. They know the instructors. They know their colleagues that were students and so forth.

Some opportunities for building some linkages is if the extension officers are asked to routinely deliver training on a subject over and over and over, there might be an implication for improving that

instruction at the AET institution. So if graduates of AET institutions need remedial training and the extension service is providing that remedial training, then perhaps if there were a feedback loop, then the instructors at the AET institution would say, well, wait a minute. Maybe we need to focus more on this and not on this.

Some considerations that might help facilitate this linkage would be collocation of facilities. So if there's an ag education training institution next to or beside an extension facility, then that provides those opportunities just by geographic proximity. We talked earlier about providing field experiences for students at AET institutions. Perhaps the extension system might be a great opportunity for students to get some practical, real world experience working with an extension officer.

And because the extension officers are interacting with the direct stakeholders more on a day to day basis than the AET instructors are, there should be some great opportunities for extension officers to be able to provide feedback to the AET institutions about what are the needs of the industry in building those connections.

Again, gender, do males, females have the same opportunities within the different systems? And we know that in some places they do not. And so if we're thinking about developing programs and interventions, we've got to consider about how to appropriately provide opportunities for males and females.

But as we draw closure, and I apologize for not providing quite enough time for questions, but as we draw closure, as we walk away today, what do I want you to walk away with? Number one, as you think about AET, think about it as a broad system with many different pieces interacting. And if you want to make systemic change and systemic impact in a country, in food security, you've got to look at the entire system.

And so today, I've proposed for you five linkages. That's not a comprehensive list of all the different linkages that could be there, but in my opinion, these are some of the more important ones to think about. One is the linkage between theory and practical instruction within an institution. The second is linking AET and industry. The third is linking AET at the different levels of instruction. The fourth is linking the different types of AET institutions, government, non-governmental, private, etcetera. And then the fifth is linking AET and extension.

And if I were to prioritize these, I would probably, number one, the linkage between theory and practical, and then number two, between AET and extension, are the greatest opportunities for making some

good changes.

And for the folks in the room, I'll be glad to stick around and chat, but I've also got some of my cards, if you want to take one of my cards, and we can talk at a later time, or shoot me an email! Thank you.

*[Applause]*

*[End of Audio]*