



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative



USAID
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Agrilinks

AGRICULTURAL RESEARCH FOR IMPACT: PARTNERING WITH FEED THE FUTURE INNOVATION LABS

AUDIO TRANSCRIPT

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PRESENTERS

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Dr. Irvin Widders, Michigan State/Feed the Future Legume Innovation Lab

PRESENTATION

Rob Bertram:

Thank you, Julie, and good morning, everybody. When Feed the Future was set up now four or five years ago, really, I think all of us were very encouraged by the fact that science and technology were seen as an integral part of the meeting the global food security challenge, and in that arena, our – perhaps our largest set of partners that we work with in this regard are the US university community.

And I think in particular, they bring the cutting edge science, as do some of our partners in the private sector. They bring the knowledge of the development on the ground, as do some of our other partners, like the International Agricultural Research Centers. But they bring a very special dimension to our programs, and that is the capacity building through the collaborative research that they do, and really working one on one with scientists in national programs, in universities around the world, but also with those institutions in ways that have lasting human and institutional impacts.

So I'm delighted this morning that we are going to hear about how we have really upped our game in engaging the US university community in meeting the global food challenge that President Obama, Secretary of State Kerry, and Rod Shaw have laid out for us, and has embodied in our Feed the Future initiative.

So we're going to start this morning with an overview from the Agricultural Research and Policy Office, and then we're going to hear a couple of examples of the labs in action, and how the Feed the Future Innovation Labs, led by our US university partners, are making a difference on the ground.

So we're going to start with hearing from the director of our research team, and that's Dr. Saharah Moon Chapotin. Dr. Chapotin is now with us for eight years, which is hard for me to believe. The time has flown. But that means I guess we've been having fun, Saharah Moon. And she comes to us from a terrific background, having worked at the Biosafety Institute for Genetically Modified Agricultural Products at Iowa State University, where she worked on regulatory issues prior to coming to USAID. And she comes to us before then with her doctorate in plant physiology from Harvard University, and her undergrad from Stanford.

She was also a AAAS Fellow, and that's been a program that has been so essential to bringing science into development in the US government as a whole, and in USAID in particular. And I would finally just add a personal note to say that I think the standing up the Feed the Future Innovation Labs has been a real labor of love for Saharah Moon.

So as I said, we're going to have two who are actually managing the Feed the Future Innovation Labs, and both of them are longstanding partners to

USAID, and no development challenges, capacity building, and science, and how those can come together in terms of outcome that drive gains in incomes and nutrition and the other objectives we have in our work overseas.

And first of all, Dr. Muni Muniappan from Virginia Tech University, where he leads the Feed the Future Integration – Feed the Future Integrated Pest Management Innovation Lab. The lab works in 12 Feed the Future countries. Muni is a world-renowned specialist in economic entomology, and if you ever get to travel with him, you're going to learn a lot, because he knows more about every insect that's causing any problem, and even some of the ones that aren't causing problems. And it's great fun to see him in action, which I've had the pleasure and honor of doing a couple of times.

Muni got his doctorate at Oklahoma State University, and he's been involved in tropical agriculture research for over 35 years. So Muni, it's a great honor to have you with us here this morning.

And then Dr. Irvin Widders from Michigan State University. He's a professor of horticulture there. And Irv is the director of the Feed the Future Innovation Lab for Collaborative Research on Grain Legumes. He has been leading USAID's legume efforts for a while now. I would – he was director of the Bean/Cowpea Collaborative Research Program from 2000 to 2007, and then the Dry Grain Pulse's CRSP from 2007 to 2012, so almost 15 years as a partner to us, Irv.

Irvin comes from the University of California at Davis. That's an institution near and dear to my own heart, and where he did his PhD in plant physiology. And as I said, Muni has encyclopedic knowledge of integrated pest management. Irv knows everything there is to know about legumes and how they are produced in tropical environments, and again, is a great person to see in action on the ground. So I think both of them this morning will give us a glimpse of just how this work is going on, and the guidance and the objectives that their programs, their respective programs, are tackling. So now with no further ado.

*Sabarab Moon
Chapotin:*

Well, thanks, Rob, for those very kind words, and it's a real honor for me to be sharing the panel today with Irv and Muni, who I've had a lot of respect for and really learned a lot from over the years, as I've been working here, as Rob said, for almost eight years, which I'm not quite sure how that happened either.

I'm going to be speaking today about the Feed the Future Innovation Labs, giving you a bit of an overview about how they fit into our Feed the Future research strategy, and just some of my really kind of stream of consciousness thinking about ways that you – and when I say you, I'm assuming there's a bunch of different partners both in the room and online. I'm assuming

there's some mission staff folks, there are some US university folks, there are potentially some international or national research partners, and then finally, some development partners. So I'm going to try to put some ideas out there about how those various groups can work with the Feed the Future Innovation Labs.

I'm not going to spend too much time on Feed the Future. I'm assuming our audience knows that Feed the Future is the US government's global hunger and feed security initiative. Here on the screen are a list of the different things that we do under Feed the Future. I'm focusing on number three, which is to support research and development to improve smallholder agriculture in a changing climate.

A few years ago, we went through a consultative process to develop the feed the future research strategy. Again, I'm not going to spend time today really talking about how that happened, but the outcome was that our overarching goal under the Feed the Future research strategy is sustainable intensification. We have three main long term research themes. We are advancing the productivity frontier. We are transforming key production systems, and we're improving nutrition and food safety, and we're doing this through targeted research and through connecting our research investments to the work that our missions, their development partners, and other development partners and research institutions are doing around the world.

Our research strategy is anchored in key geographies. It is a global research strategy, and it addresses global issues, but it is anchored in these key geographies: the Indo-Gangetic Plains in South Asia, the Sudano-Sahelian Systems in West Africa, the Maize and Livestock Mixed Systems in East and Southern Africa, and the Ethiopian Highlands.

About a year and a half ago, in response to a study that was – the administrator ___ BIFAD that's the Board on International Food and Agriculture Development, a Presidentially appointed advisory board to USAID, he asked them to do a study of what was then the Collaborative Research Support Programs, the CRSPs, and other ways of engaging with the US university community.

And as a result of the outcomes of that study, we launched the Feed the Future Food Security Innovation Center, and this brought our research investments, our capacity building investments, under one umbrella within Rob's office. And we – it helped us to reorganize how we work and to focus our management of our research activities on more thematic areas, so we now have seven priority research areas through which we implement the Feed the Future research strategy. We have a multidisciplinary approach, where we have better linkages between our related projects, and we're able to better do cross-project learning and manage more effectively.

And then finally, through the Feed – the Food Security Innovation Center, we renewed our engagement, particularly with the US University community, but also with researchers and research communities across the globe more broadly.

Part of the establishment of the Feed the Future Food Security Innovation Center was the establishment of the Feed the Future Innovation Labs. In this portfolio of innovation labs now there are 23. They encompass both the former CRSPs, which transformed themselves into the Feed the Future Innovation Labs, and also a series of new investments. And so through this transformation, we've been able to both strengthen and work – and build on the existing model that was in the CRSPs, and also try out new models of how we might work with the US university community and their partners overseas.

So in fact, as I go through, I'll sort of mention a few of these different models. But we're now trying out a number of different ways of engaging. We have large programs similar to the former CRSP model that work with a number of universities and cover a breadth of research topics around an area like integrated pest management, for example, and we have much more focused innovation labs that are really focused in one commodity and a particular research issue, and bringing a number of partners to really focus in on that topic.

The Feed the Future innovation labs do research that's aimed at improving agricultural productivity, it's strengthening value chains, and focused on the problems that smallholder farmers face in developing countries. They establish partners. In particular, the Feed the Future Innovation Labs have a long history in partnering with our national research partners and universities in the countries where we work. So building those direct linkages between the US universities and the universities overseas, for example, has been a real hallmark and a real strength of how the Feed the Future Innovation Labs and their CRSP predecessors have worked.

As Rob mentioned, they do a tremendous amount of capacity building, both in terms of student training, but also in terms of working with institutions that do training, strengthening them, supporting curriculum development, short term training. A number of graduate students have been – many, many, many graduate students have been trained in the US over the years, but also at home institutions under the mentorship of scientists affiliated with the innovation labs.

And finally, they've always engaged in this technology scaling space, and I'll talk more about technology scaling. That's a real current focus for our initiative, and the Feed the Future Innovation Labs are central to that, because in a sense, they're often the ones generating the technologies that our missions and other development partners can scale.

I do want to mention, although I'm speaking today about the Feed the Future Innovation Labs, they are just one part of our broader food security innovation center portfolio. We have research activities that are led by the private sector, by CGR centers. We have university activities that are not Feed the Future Innovation Labs. We work with our NARS partners overseas, our NGOs. So just keep that in mind. As I go through, I'm giving you Feed the Future Innovation Labs examples, but each of these program areas has many, many other research partners as well, and they often work with the innovation labs.

So I mentioned we have seven program areas under the Feed the Future Food Security Innovation Center, and I'm going to go through each of those. I'm not going to spend too much time, just because our time is limited today, but at the bottom of each of these slides, you'll see there are the Feed the Future Innovation Labs that fit within that program area. So I'm just kind of listing them here, and I'm going to talk a little bit about each of these program areas and what we're trying to accomplish and how we work.

And I just want to note, if you go to the Feed the Future website and you look under the research activities, there's actually a research brief, a four-page research brief on each of these program areas, where you can find the complete list of all the partners that we work with and all the projects that fit under this program area, and some additional information about how we work with the different partners in these programs areas.

So the Program for Research on Climate Resilient Cereals recognizes that smallholder farmers around the world often have cereals at the heart of their production systems. We recognize that you can't just eat cereals, but most farmers are growing cereals, and cereals are particularly vulnerable to the impacts of climate change. And so if we can help strengthen and stabilize their cereal production, that allows them to free up resources, to free up land, to free up labor for other investments in legumes or horticulture or animal source foods, things that can be more productive and also more lucrative.

So that's the strategy here, but this is recognizing really that by having impacts in cereal production and processing and marketing and so forth, you can have broader impacts across entire agricultural systems.

Our cereal program has strong connections with the private sector. We work a lot with the Bill and Melinda Gates Foundation. We co-fund and leverage each other's investments. And you see there are five innovation labs that fall under this area. The Sorghum and Millet Innovation Lab is the one that is most closely following what was the former CRSP model. A number of universities and other research partners have competitive sub-awards under the Sorghum and Millet Innovation Lab, whereas the other four that are listed here are more focused on a particular topic, and are actually working a bit more upstream, in a sense, than our portfolio has really done over the years. And I think that's been one of the real exciting outcomes of this new

way of working, is that with the enhanced resources we have available to do research, we're able to push that boundary a little bit and really do some of the foundational, really exciting sort of cutting edge investments that are going to lead to really major impacts down the line, particularly in the areas of genomics and genetics.

The Program for Research on Legume Productivity, Irv will be speaking. He can say a lot more about legumes. But this is recognizing the importance of legumes in smallholder systems, both from a nutrition perspective, from an income perspective, particularly for women, and from a soil fertility and the sustainability of the system. So we make our – we do investments in increasing the productivity of legumes, and we're aiming to impact on all of these areas, income, nutrition, and sustainability.

We have a few large programs, innovation labs that are anchoring our program in this area. Grain Legumes, Irv will be speaking about that one. We have a Peanut and Mycotoxin Innovation Lab at the University of Georgia that is focused on peanuts and research along the peanut value chain, but also makes investments in mycotoxin control throughout other commodities, so not just focused on peanuts.

The Soybean Value Chain Research Program Innovation Lab is one of our newer Feed the Future Innovation Labs, and actually, Achmed Kablan here in the room is managing that one. If you wanted to find out more, you could chat with him afterwards. And then again, a number of newer innovation labs, one each on beans, chickpea, and cowpea, that complement our investments in this area.

The Program for Advanced Approaches to Combat Pest and Diseases recognizes the strengths of the US scientific community in applying tools like biotechnology and genomics to diseases in both animals and plants. There's only two Feed the Future Innovation Labs that are specifically focused on this topic, though I would say a number of the innovation labs in the other areas also address pest and diseases. A number of our biotechnology investments, which I'm not listing here because they're not exactly – they're not called innovation labs, but they do work with US universities, but they also really tap into the strengths of the private sector.

But our two newest innovation labs in this area focus on animals, genomics to improve poultry, which addresses both climate resilience and Newcastle disease, and one on Rift Valley fever control in agriculture, developing a new vaccine against this disease.

The Program for Research on Safe and Nutritious Foods is one of our broadest program areas. This is the one that is both seeking to increase the availability of and access to nutritious foods, such as animal source foods, horticulture products, some bio-fortified crops, but also leads a major research agenda around nutrition in smallholder farming systems, and what

are the types of agricultural interventions that will actually have an impact on nutrition?

The Nutrition Lab at Tufts University is leading that effort. We have a couple of the larger programs, aquaculture and fisheries and horticulture, and then a newer innovation lab, the Reduction of Post-Harvest Loss. We're pretty excited to get into this area. Post-harvest issues are a major issue, and this is our first sort of focused investment through the innovation labs in this area. And then finally, the Adapting Livestock Systems to Climate Change, also one of the innovation labs that was transitioned from the former CRSP model.

Our Program for Policy and Markets Research and Support is led out of the Policy Division, also within Rob's office. This is focused on the agricultural policy environment needed to advance agriculture and food security in developing countries, and it does both research and policy support. There are two innovation labs in this area. The Assets and Market Access out of UC Davis has been going for several years, and this summer, we launched the new Food Security Policy Innovation Lab at Michigan State University.

Our Program for Sustainable Intensification is where it all comes together. This is the program that is looking at how you transform systems to make them more sustainable, more productive, taking into account the nutrition dynamics, the gender dynamics, the policy dynamics, looking to make systems more diversified, more productive, more resilient, particularly to climate change, but also building sustainable systems that allow farmers to get access to seeds, commodities, better management practices, extension services. So this is really where it all comes together.

We have – this is where the lab that Muni directs, Integrated Pest Management Lab, falls in this area, along with the _____, both at Virginia Tech, and our newest innovation lab in this area is the Small-Scale Irrigation.

You'll see at the bottom I've mentioned we have two RFAs out on the street right now for two new innovation labs that will fall in this area. I'll say a little bit more about that in a few slides.

Finally, our Program for Human Institutional Capacity Development. You'll see there aren't any innovation labs listed under here, but all of our innovation labs do capacity strengthening. But we also have a suite of mostly university-led programs that do work in this area. There's another team in Rob's office, the Human and Institutional Capacity Development Team that works on this.

So I mentioned scaling technologies. This is something that our administrator is very excited about, and really pushing us to achieve results at scale, taking technologies that we know to be – that would work, that will help farmers be more productive, or help them to gain greater incomes, but

technologies that are currently, as he says, not reaching nearly enough farmers. So this is a cross-bureau, cross-effort, cross-Feed the Future focus on really trying to scale up productive technologies. And I think – I'll get to that in a second, I think, how the innovation labs could really have a role to play in that as well.

So now thinking about how can you partner with the Feed the Future Innovation Labs, and if you are a mission, for example, a USAID mission or other USAID bureau, I've listed a couple of – some ideas here, but really, through the innovation labs, you could support relevant, targeted, applied research that really is targeted to the areas in which you're working, to the zones of influence with the partners that you're already having relationships, and addressing some of the key questions that are making it challenging for you to accomplish your development objectives. So that's one area.

But you can also work with the innovation labs to access the recent research outputs, whether it's the technologies and the knowledge. You can link them to your value chain investments. You can bring scientific experts into your circle of implementing partners, and you can strengthen your scaling agenda by getting better information on which technologies will work, why, when, and where, and work with them to try out new things. You can get students trained. You can strengthen the research and institutional capacity of the institutions in your country. That will have, I think, a strong impact on advancing the objectives of USAID forward, of local capacity building, and you can always invite the innovation lab staff that are working in your country to your partners' meetings to help them build those connections to the – your value chain partners.

There's a few ways to do this. Many of the innovation labs are leader with associates, so you can do an associate award and develop your own program. You can do some buy-ins, sometimes limited in scale, but we're happy to work with you. But you can also just strengthen the field level engagement between the innovation labs and your partners, and that doesn't always require a new activity. It can require simply a connection, and helping that better scientific information flow back and forth.

You can also help the innovation labs identify trainings that you think are important to bring into their training programs, and help them to set research priorities that will be relevant for the country. And you can always ask you friendly AOR and our team, all the folks who manage these innovation labs, for help in doing that.

I've listed here the innovation labs that are leader with associates. The two that are coming out will also be leader with associates. The ones I've underlined are the newest ones that not everyone may be aware of.

Some of the Feed the Future Innovation Labs are cooperative agreements. This means you can't do associates awards, but we're willing to work with

you on buy-ins, if you're interested in engaging with these labs. Of course, you can always work with them through technical interactions and partnerships, through connecting on student training, and in some cases I said buy-in. I've highlighted the Small Scale Irrigation Innovation Lab at the top because that's a larger one, even though it's a cooperative agreement, and I think that one has activities that will be very interesting to and relevant for missions. So talk to us if you're interested in that.

And chickpea is actually already receiving support from both Washington and Ethiopia, so that's an example of how it's being co-supported by different operating units. And I've highlighted the Washington State University Climate Resilient Wheat program, because it's also a bit larger, and it is training a significant number of students, and in some ways, it's acting a bit like the former CRSP model, even though it's one of the newer innovation labs.

So colleges and universities, particularly in the US, but also other research institutions. How can you work with the Feed the Future Innovation Labs? Well, you could apply to be a lead institution one of the new innovation labs. You could join a consortium that is applying to be the lead consortium on one of the new innovation labs. But you can also apply for competitive sub-awards under the innovation labs. Many of the innovation labs, once they receive the award from USAID, then run their own competitions to select the researchers and the research institutions who will be doing the work under the innovation lab.

So perhaps you are a scientist and you don't want to spend your entire life managing a huge program, with both Irv and Muni can tell you is a significant investment of time and effort and resources on the part of the university. You might really wish to come in and bring your technical expertise to bear on a very focused question, and you could do that by applying for a sub-award.

You can partner with an existing innovation lab to support a new associate award coming from mission, for example. You could join existing research activities, or you can simply collaborate with the existing innovation labs, and through them, get access to the partners and the facilities and the connections that they have overseas as you bring your own research agenda to the table.

You can host students under some of the capacity development programs, and you can always attend a project meeting, if you want to learn more about what they're doing.

So I mentioned I would – these are the forthcoming opportunities for Title 12 institutions. Here in the United States, these are mostly land grant colleges and universities, or colleges and universities that have the set of skills

that you need in order to do international agricultural development research work.

So I mentioned the Feed the Future Innovation Labs for Sustainable Intensification. That RFA closes in a few weeks. The Feed the Future Innovation Lab for Integrated Pest Management closes in late June. The current SANREM and IPM Labs will be reaching the end of their natural ten-year life, so these programs are being re-competed as per USAID procedures.

There will be a new livestock research priority setting process underway this summer, and we're going to invite all of you, the entire community, to engage with us as we set priorities for livestock research. Two opportunities we've identified already, we're going to have a symposium at the American Society for Animal Science Meetings in Kansas City July 24th. Please attend. You'll hear from different speakers, kind of lay out thoughts for livestock research, and you can also contribute to a discussion on what you see as livestock research priorities for USAID to impact developing countries.

And then we're right after that going to be running an e-consultation on animal research priorities, and our colleagues at Agrilinks and KADAD will be supporting that, and there'll be announcements forthcoming on that as well. If you're at a USAID mission, you'll be looking for internal notices about consultations, and we'll be engaging with you in this space as well.

So now to development partners. How can you engage with the Feed the Future Innovation Labs? And this is everyone from the large development firms to the NGOs working in country to USAID grantees in country. You can invite the innovation lab personnel to join your product – your project, sorry, and to provide technical support, and to share their experience as to what will work and what won't work as you're working with farmers in Feed the Future areas.

You can access the innovations, the technologies, the management practices that are coming out of the innovation labs, which have been tested in the field perhaps on a more limited scale, and you can try to take that to a much larger scale through your development programs.

You can contribute to establishing what the innovation lab research priorities should be, perhaps as they're getting ready to put out a call for proposals. You can engage with them and share with them some thoughts on what are the kinds of research that would really have an impact where you're working.

You can work with them to establish joint field sites and take advantage of the research that they would be doing in the same areas where you're doing your development activities. You can pilot the new research outputs that are coming out. You can give them feedback on how to fine-tune those. You could access potentially training and capacity building opportunities for your

staff. As they're trainings in country, you could send a few people to join in with that.

And you can usually be able to attend project meetings or ask them to join your implementation meetings, and try to build some of those on the ground connections.

So with that, I'll just say to feel free to get in touch with me if you have any questions about any of this, and a lot of this information is also available on the Feed the Future website. Thanks very much.

Muni Muniappan:

Rob, thank you very much for the nice introduction. I do enjoy working with the insects in addition to managing the IPM Innovation Lab. My title of presentation is "The Mission ___ IPM Innovation Lab ___ Project ___ Value Chain Project and the ___ Collaboration in Nepal." This idea is the brain child of the USAID mission in Nepal, and we are very happy to implement this model in Nepal in enhancing or scaling up the IPM technologies in Nepal.

IPM Innovation Lab has been working in Nepal for the past ten years, and we have been primarily working in what we call the mid hills area that is over here in Kathmandu and ____, and we have been developing IPM packages for high value vegetable crops.

What I mean by IPM package is developing alternate technologies where pesticides, chemical pesticides need to be used by the farmers, we come up with alternate technologies to replace these chemical pesticides, and we try to cover all the problems faced by the farmer, from the time of sowing the seed up to the harvest. And then we put these technologies ___ into your package, give it to the scientists, and extension agencies in those countries, and ask them to translate in the local language and pass on to the farmers.

Here is a list of package technologies in the IPM tomato package, just to give you an example. We do have several packages developed for the high value vegetable crops.

So to start with, we need to have a healthy – selection of the healthy seed that is disease free and also high yielding one. Then, production of healthy seedlings, then treatment of the seeds or seedlings with the Trichoderma. That is the ___ fungus. It protects the seedlings from other pathogenic fungi, and also treating with Pseudomonas. I'll go into a little bit of detail later on about these treatments. And also grafting to overcome bacterial wilt disease. Bacterial wilt is a soil-borne disease. It – you know, it is very common in the humid, tropical regions. Then staking and mulching. That is a very common practice recommended in tomato. The use of ____, mostly for monitoring insects. And then use of natural enemies for control of the pests.

Then some of the other technologies, like _____ and _____ period we also recommend or utilize those technologies for controlling various diseases. Then we – all our recommendations are based on biopesticides, so that we'll be able to replace the chemical pesticides. Then we also use microbial pesticides in our recommendations.

But before I go into these technologies, individual technologies, in Nepal, we have been working with the US universities, Penn State University and Ohio State University, and also with the NGOs, IDE that is, International Development Enterprises, and CEAPRED. These two NGOs also collaborate with us.

Coming to these individual technologies, like healthy seedling production, that's very important. In developing countries, most of the farmers place their seedlings in one corner of their field, just digging little plot, and then putting the seeds on them, trying to raise the seedlings. In that process, they almost lose 50 percent of the seedlings due to PTM or other disease attack.

But recently, in southern part of India, they came out with the technology of using coconut pith as a seedling media. They put the coconut pith in the plastic trays, just like here we use peat moss as a seedling media. But peat moss is not available in developing countries. Coconut pith, it is a byproduct of the coconut husk that is used for producing fibers, or the ropes. And that pith was a waste material for a long time. They didn't know what to do with it. In fact, it used to harbor insects that attacked coconut trees, so they used to throw this material out.

And about six, seven years ago, they found that this pith could be used as a seedling media. And what used to be a waste became a goal now. Not only they are using this as seedling media in India for – but also, they are exporting this material to other countries. Recently, this technology has introduced to Nepal. These two slides were taken in India, and this slide was taken in Nepal. So it is catching up in the developing countries, and through the IPM Innovation Lab, we are trying to introduce this to other countries in Africa and Latin America.

The other technology we are trying to introduce is the use of Trichoderma for treating seeds and seedlings. As I mentioned earlier, Trichoderma protects the seedlings from the pathogenic fungi. And this technology has caught up like wildfire in India. There are about 500 companies producing Trichoderma and Pseudomonas and selling it, and recently, this technology was introduced to Nepal. There is a company, _____ company that is producing and selling it. And I will talk about that company a little later.

In India, used of – the _____ is used as a medium for production, and selling it to the farmers, but in Bangladesh, they inoculate Trichoderma in the compost bins, so here, you can see the compost bin is inoculated with Trichoderma, and the liquid that come out of this bin, they collect it in a

bottle and sell it as a Tricho liquid or Tricho _____, and it is used to control pathogens, _____ pathogens. And also, they dry the compost and sell it – package it in plastic bags and sell it to the farmers throughout Bangladesh. In addition, also, they – also, women _____ produce Tricho compost in their backyards and use the compost in their farms.

Another technology that we have introduced, as I mentioned earlier, is the grafting. Grafting is important to overcome bacterial wilt disease. Bacterial wilt is a soil-borne disease. It is quite prevalent in the humid tropics. And in the infected soil, if you try to grow say a tomato, eggplant, or pepper, they will grow up to flowering stage and then die. There is no chemical available to control this disease. The only method is to graft the desirable scions on the top of the resistant root stock. We've found several wild eggplant varieties are resistant to this disease, so we recommend growing wild eggplants' root stock and then grafting the desirable eggplant or tomato scion on the top and planting that in the field, in the infected field.

This technology was introduced to Bangladesh about 15 years ago. Since then, it has been transferred to several countries in Asia, Latin America, and the Caribbean, as well as in Africa.

Pheromone traps. We use pheromone traps primarily for monitoring insects in the field. If there is a peak catch of the particular insect, then we try to come up with the control measures in the field. There are about 12 different pheromones available for most of the important vegetable pests of the tropical vegetable crops. So here are some examples. Here is a pheromone trap used for catching the eggplant _____ _____. It is a very serious pest in Asia and Africa. And here is another trap used for catching the _____ worms, as well as the tomato fruit borer, and the third one over here is one we use for capturing the fruit flies. It primarily – they pretty much mostly catch male insects. But this fruit fly trap is used on a _____ wide basis in Bangladesh for controlling melon fly in the bitter melon fields.

We are also using – recommending use of natural enemies, like parasites and predators. We use – we adopt all the three different types of biological control, like classical biological control, _____ release of natural enemies, and also conservation biological control.

The classical biological control, what it means is it is – classical biological control is very effective against the introduced invasive species. For example, recently, a pest called papaya mealy bug got introduced in India. It originated in Mexico, and in 2008, it got introduced in India, and by 2010, it wiped out all the papaya trees in Southern India, and also started to get into the mulberry plants. Mulberry and the silk industry is a major one in southern part of India, so it became a major problem over there.

So we recommended introduction of a specific parasite for this mealy bug from Mexico, and that technology – that introduction happened through the

collaboration of the USAID mission in India, ICAR, and other national universities. And the parasite was introduced in August 2010. By January 2011, the whole India was very happy, because the parasite was able to bring down the population of the papaya mealy bug, and now papaya as well as mulberry is free of this insect.

Now release of this – other parasites ____ for ____ release of the parasite is carried out for most of the native pests, like controlling some of the ____ borers and cut worms. This is practiced in Bangladesh for controlling the tomato fruit borer and other caterpillar pests. In Honduras, they use some of the predatory bugs for control of ____, mice, and whiteflies. And we are also planning to use this technology for control of these South American tomato fruit borers that has been recently introduced from South America to Europe, and it is spreading into Africa, and eventually, next few years, it will be in Asia. So there, we will be using the natural enemies, ____ release of natural enemies, for controlling the tomato fruit borer, known as tuta absoluta.

Conservation biological control is nothing but the integrated pest management. If you don't use pesticides, we are able to conserve the natural enemies in the field. That ____ the conservation and controlling some of the major pests.

We also recommend use of neem. Neem is very common in – all over the tropical world, especially in the arid tropics, and neem products are very widely used in India, and also now in some countries in Africa have picked up. But we are promoting use of neem products in the IPM packages.

In the vegetable production, especially the high value vegetable production in the tropics, virus are a major – virus disease are major constraints. Peanut bud necrosis virus, it is transmitted by Thrips. It's another major problem in India. Even though it is called a peanut bud necrosis virus, it attacks peanuts as well as tomatoes. So it is a problem on tomatoes in India. For that, we have recommended a technology called roguing. And roguing technologies seem to work. If the farmers adopt roguing in the nurseries; that is, removing all the infected seedlings in the nursery, and plant – then planting in the main fields, seems to increase the production almost two to three times.

Another disease problem is the geminivirus known as tomato yellow leaf curl virus. It is common throughout the tropical world. To control this disease, we recommend a technique called ____ period, and this technique is currently adopted in Dominican Republic, Senegal, and Mali, and hopefully, we will be able to introduce this technology in other countries, wherever this disease is causing a problem.

Well, coming to Nepal, in Nepal, we are working on the high value vegetable crops, primarily in Kathmandu and ____ area and the mid hills area. And we

have been involving the mission in our project quite heavily. You can see here Mr. Mayer participating – Ivan Mayer participating in one of our workshops that – the workshop is for control of virus diseases, and also Ms. _____ was participating in one of the meetings that we had with the agricare industry. So we have been involving mission in our program.

And in 2013, USAID mission in Nepal gave us an associate award and asked us to transfer the technologies that we developed in Kathmandu and Pokra area to the Feed the Future area in the Western Terai area. Western Terai area is over here. In this area, they asked us to implement this technology, or transfer this technology, in the ___ and ___ districts.

And they also developed a model, or at least introduced a model, in that one. USAID mission in Nepal gave us an associate award, and also, it gave an award to _____ International for a value chain project that is known as KASON, and asked us to train the technicians of KASON project in IPM technologies. So we trained their technicians in IPM technologies, and the technicians transferred the technology to the farmers.

So this model seemed to work well, and we are very happy about it. We don't have that many employees to transfer all of our technologies in the field, to the farmers, so working with KASON project is really ___ for us. And actually, this arrow should be a dotted line. Our project, the core project, is funded from Washington, and core project is, you know, whatever technology is developed in the core project is transferred through the associate award, through the KASON project, to the farmers.

Meanwhile, we are working with the KASON project. We've found this company, Agricare, it is a private company that produces biopesticides and biofertilizers, and we have been working with that company in improving the quality of the products, and they are very happy about it. And we are also conducting some international workshop using that company as a venue in Nepal. And then that company sells its products through the AgriWorks or the retail stores, and then it goes to the farmers.

So in both ways, we are working closely with the KASON and the Agricare company in taking the products ___ IPM technology to the farmers.

Well, here are some fields. You know, we conduct field trials, field demonstrations, in IPM Innovation Lab ___ KASON jointly conduct these field demonstrations, so that the farmers can see the advantage of using these IPM products, and then they can adapt them.

In this slide you can see this – these two slides here, IPM Innovation Lab scientists are providing training to the KASON technicians and staff. In the other slide here, these four slides are showing that some of the visitors of the Innovation Council meeting that visited Nepal last month, also had a chance to visit the IPM sites, and the Nepal ___ and ___.

Now this slide shows the Agricare products. The Agricare private company in Nepal is producing Trichoderma, _____, _____ and so a lot of products, and we are helping them. And they also – we also had the opportunity of one of our ____ members, Mr. Marty ____, visiting one of the stores of the Agricare that was placed in the exhibition.

This slide shows the _____ having the bioproducts. And also, we had the opportunity of the USAID administrator recently visiting Nepal, and when he visited Nepal, he had an opportunity to also visit one of the IPM sites at Kathmandu. Thank you very much.

[Applause]

Dr. Irvin Widders:

Thank you for the opportunity this morning to talk about extending seeds and improved varieties, in this case, beans to smallholder farmers. As was shared by Saharah Moon just a few minutes ago, many of the innovation labs, or all of the innovation labs, essentially support a portfolio of research and institutional strengthening projects. Some are more focused than others. The expectation from all of these projects is that there are going to be specific outputs. They may be technology products, new knowledge that could be generated from these that's a public good that contribute to development outcomes, and ultimately impacts, of course. We as programs feel highly accountable to our donor, USAID, who is making these investments.

Unfortunately, scientists sometimes like to just focus on the outputs, and this area of adoption, uptake, how technologies are transferred into the field, is somewhat of a black box for them. They don't give a lot of thought to that. But it's a very, very important exercise to go through. In all of the projects in the Legume Innovation Lab, we require our scientists at the inception of any research project to develop what we call an impact pathway plan.

We give them a worksheet that they need to complete. In that worksheet, they need to think about who are going to be the target beneficiaries, what are their needs, what are the constraints that they need to address, how do they need to design a technology that responds to the needs of those beneficiaries. How is a technology going to be transferred? Is there going to be a requirement for field validation, for adoption, for the development kinds of work? And to whom are they going to pass off that output? Are they – it's more than just publication of a research paper. Who is going to take that output, that technology, and then ensure its dissemination, and that it gets to the end users?

There are situations, however, where we develop wonderful, superior technologies that really could transform the world that could be beneficial to smallholder farmers, but that miracle doesn't occur in the middle, and we sit here scratching our heads sometimes.

This morning, I'm going to be talking about an example where in our case the Bean and Cowpea CRSP or the Dry Grain Pulse's CRSP, and more recently, the Legume Innovation Lab, have been investing in breeding and genetic improvement of bean and cowpea varieties with resistances to diseases, to other pests, to – with adaptive traits to high temperature, drought, whatever, but they haven't been reaching the farmers, and thus they haven't been getting impact.

Three years ago, USAID gave us – USAID Washington, that is, and many thanks to you – gave us an associate award with this long title. We call it affectionately BTM, or the Bean Technology Dissemination Project. It was targeted at four countries in Central America. Our programs work in Latin America, but mostly in Africa, but we have a long history of achievement in Central America, so it made a lot of sense to focus on four countries which at the inception of this project were Feed the Future countries.

The justification for USAID's investment in this project was Feed the Future, obviously. They were looking for low-hanging fruit. Where were there technologies that if transferred, if scaled up, could really benefit smallholder farmers? They certainly wanted to increase agricultural sector productivity. Varieties do that. And they wanted to invest in a commodity that was nutrient dense that achieved their nutrition enhancement objectives.

The objectives of the Bean Technology Dissemination Project, or BTM, were simply to improve access. In the first place, access to the improved varieties, the technology that we had generated over the years that had high yield potential, resistances, all the traits that we thought smallholder farmers needed and were looking for.

We also wanted to disseminate or make – improve access to quality seed. And one of the messages I want you to take away this morning is that quality seed is a different technology or item than an improved variety. An improved variety is the genetic potential, but what a farmer plants is seed, and the quality of that seed, is it disease free, is it vigorous, does it have high germination, all these traits, these are vitally important to a farmer achieving his productivity goals.

And finally, the other message that I want to communicate to you, that when you think about grain legumes, there isn't one technology that fits all, that in a market, in a landscape, there's a diversity of varieties, market classes, types, with different attributes, agronomic as well as culinary attributes, that are very important to both farmers as well as consumers.

Here is a slide that shows the – some of the productivity of these three programs. Since 1982, we've released over 25 varieties in a diverse range of market classes targeting this region, Central America and the Caribbean. For those of you who may be interested in the specifics, I brought a very nice

handout which identifies all these varieties. Note that there are diverse types, small, black, red, red mottled, light red kidney. These are all types that are commonly grown and are important to these areas.

But they weren't getting out to smallholder farmers. We did adoption studies. Some of the varieties got out, but not – many of the others didn't.

When we took on this project, in addition to what USAID wanted, we also wanted to achieve sustainability goals. We wanted this to be more than an intervention that for three years gave farmers access to seed or an opportunity to experience a variety. We wanted there to be something that continued beyond the life of the three year project. And so we wanted to focus on that black box, that mystery. We believed it was a dysfunctional seed system, and we still believe that that's a major, major, major constraint in many parts of the world where grain legumes are produced and consumed. We also wanted to instill an appreciation among smallholder resource poor farmers of the value, of the importance of planting quality seed.

Let me talk briefly about the challenges. Why are seed systems dysfunctional? What are some of the unique things? As with any project, and you all probably have experience in this, they become learning activities. You think you understand something when you initiate a project, but when you begin implementing it, you really discover how important certain things are, and why certain things just don't work. And this was the case in this project. The obvious became the problematic.

For those of you who may not be familiar with grain legumes, most of them are self-pollinated. The implication is that farmers can therefore plant some of the grain that they've harvested a previous season, use that to plant the following year, or they can go into the marketplace and buy grain, which is usually inferior. It's not seed quality seed, or planting material, if you will. And if a farmer is resource poor, he or she is going to want to save money or be reluctant to invest in commercial grade, certified, or registered seed.

The secondary is the big one that we discovered. Obviously, beans are large. They're heavy. They're bulky. But as a result, it takes a lot of seed by weight to plant an acre, a monsana, or a hectare. It can take up to 50 to 80 kgs per hectare. That's a lot of seed for a smallholder farmer to acquire.

It's even a bigger factor when you think about cost, the cost of handling, the cost of packaging, the cost of transport of that volume and weight of seed throughout a landscape and a country to all the small little villages where there's smallholder farmers producing beans. It presents a major, major cost, and it's one of the fundamental reasons why private sector initiatives and grain legumes haven't worked. It's one of the primary reasons why commercially available certified grain legume seed is so high-priced.

Okay. So what was our strategy in this project? We decided to promote through this project community-based informal seed systems. We called them community seed banks or *[foreign audio]*, if you will, for the region. We identified in each community a couple of farmers, leader farmers that were progressive, that were committed to the concept of producing seed. We gave them training on seed production techniques. We provided them each with enough seed to plant from a half a hectare to a full hectare. We gave them registered seed so that they started out with the best seed possible, and they multiplied up that seed.

They were able to produce enough seed to supply 20 to 40 farmers in their own community, as well as have enough left over for their own conception or even some sale. And then they stored that. We worked with them on seed storage to make that seed available in the subsequent planting season.

Why is this model so beautiful or compelling? First of all, farmers assume responsibility for seed security. Think about it. We talk a lot about food security. We talk a lot about nutritional security. If a farmer doesn't have something to plant, these other issues are moot. There won't be a crop. A farmer has a vested interest in his or her ability to grow something, so that they can eat, so that they can sell something to generate income. Put responsibility in the farmers' hands.

Secondly, an opportunity to select improved varieties. As I mentioned before, farmers like to have choices. In our – in the *[foreign audio]*, one of the things we did is we gave the farmers the opportunity to pick which varieties they wanted to multiply, and some of them said, "Well, give me so much of this, so much of this variety, and so much of that variety." They tried them. The next year we came back, and they said, "We would like a different – we liked that variety, and maybe we want to try this other." They really liked the opportunity to gain experience with improved varieties and make their own choices.

Finally, it provides affordable access to seed. By multiplying locally, by handling locally, you obviate, you eliminate all the needs for transport and handling. We're very proud of the achievements. With limited resources and three years, we were able to impact and provide access to over 100,000 farmers in these four countries. We disseminated seed of 24 varieties, which I think is remarkable. There were over 400 farmer organizations and bancos that were established or we served, and our hope is that many of them continue. Even if 30, 40 percent of those continued after the life of this project, we would be happy and consider that success.

If you permit me two minutes more, I would like to talk or mention briefly about a new project that we're starting. This is another associate award. It's supported by the Guatemala mission, USAID mission. It's called *[foreign audio]*. It's very similar to the BTD project, except it goes beyond that. It extends to nutrition. We will be doing many of the same things under BTD

of increasing bean productivity, promoting improved varieties. In this case, we don't call the seed banks seed banks. We call them *[foreign audio]*, so – which I can translate for you at a later time. And we're providing a storage, ___ storage technology.

But what I'm excited about are two things: our emphasis on nutrition, linking agriculture to nutrition. We're going to be providing nutritional education to women's groups in Mayan communities, in the Feed the Future target area. And we're going to be trying to increase an appreciation for the value of an ancestral crop that these people have grown throughout millennia, if you will, that was a staple crop and a staple food in their diets, but there's not a recognition of value appreciation by them of its nutritional importance.

The other exciting aspects are our implementing partners. We're working with disparate implementing partners that have never really worked together. Number one is one of our long term partners, *[foreign audio]* from Guatemala. They were involved in the development of the improved varieties. They know the varieties. They have extension staff out in the field. They know how to manage these varieties.

But we've brought on board the Ministry of Public Health, and they also have technicians working in the field. These are public health technicians. They have a mandate to promote preventive strategies for improved health – or preventive strategies for disease, to improve health. But these two players in these remote communities never talk or work together.

We have gotten buy-in from these two institutions. They're partnering. The program is their program. They're working together. We're providing the technical assistance on these technologies and knowledge that are going to these end users, and we're going to be working in about 200 communities in the *[foreign audio]*, the highlands of Guatemala. If you invited me back in two, three years, ___ we have some experience, I'd be happy to share some of the lessons learned from this activity as well. Thank you very much.

[Applause]

QUESTIONS AND ANSWERS

Julie McCartee: Three very interesting presentations. If you wouldn't mind coming up to the front chairs, we will open it up for Q&A. And so feel free to direct a question to any one of our speakers or to all three on the panel, and I'll just go ahead and open it up, if anyone would like to ask an initial question, or if we have one from our online audience. And please state your name and organization when asking.

Rob Neuter: Hi. Rob Neuter with International Fertilizer Development Center. I actually have two questions, one for Saharah Moon. With the structure of the innovation labs, it appears that the buy-in ability is limited. I don't quite understand the rationale for not allowing a greater amount of buy-in if missions and offices want to provide the support for that. And Muni, in terms of the work that your innovation lab has done with the KASON project, could you explain a little bit more how the partnering arrangements developed, and how you were able to put that together? It sort of followed on from Saharah Moon's discussion of avenues of partnership, and I'd like to hear some of the sort of details of how you worked – linked up with Winrock, in that case.

*Saharah Moon
Chapotin:*

So without getting into the arcane USAID procurement regulations, I think we're aware that being able to buy into a program was often the most straightforward option for a mission, and we're actually working to increase those opportunities. And some of the extensions and new awards we've made recently actually have incorporated into them a much larger buy-in ceiling. So we're specifically trying to enable that.

Some of the existing awards from – that were made several years back don't particularly have a large buy-in ceiling. It's something we can – if there's an individual mission who really wants to do a buy-in, we can work with them to try to accommodate that in the award. The leader with associates mechanism was established to provide a better way from a procurement

perspective for USAID missions to make larger associate awards, and really give them control over their investment. And so there's a bit of tension around whether or not those mechanisms should accommodate buy-ins.

I will say that our – the leadership within our bureau has been very encouraging of our finding ways to make the mechanisms more amenable to buy-in. So it's – when I say limited, it's more just that usually those are smaller projects, versus the associate awards, which can be much, much larger.

Muni Muniappan:

You know, we have been working in Kathmandu and ____ developing IPM packages, and then USAID mission in 2011 came to us, said they would give us an associate award to transfer those technologies to the Feed the Future ____ in the Western Terai. And it was in 2011. Then they asked us to wait until they could award the KASON project to one of those winning companies. That happened to be Winrock. And that happened around early 2013.

So then they awarded us the associate award in March 2013, and then they guided us to work with Winrock, KASON project, so that – in a way that we trained their technicians, and their technicians take the technologies to the farmers. And we also conduct a few demonstrations in collaboration with the KASON project. And we conduct several other workshops for the KASON project. It is kind of – you know, we also get the feedback from them in some form, like they are not able to get some of the biopesticides ____ we recommend them.

Then we go back to the ____, train them how to sell those products to the farmers, give the information, and also, we work with the Agricare, the company, in improving the quality and disbursing the material.

Julie McCartee:

Do we have a question from our online audience?

Marisol Pierce-Quinonez:

Yeah. This one is from Lolia Deso from RUTA in Costa Rica, and as a development partner, the program would be interested in collaborating with the Sustainable Intensification Lab. Should they contact the lab directly, or what are the steps to take? And Carol actually took a – Carol Levin is online and has been commenting throughout the webinar, and mentioned that the Sustainable Intensification Lab doesn't yet exist yet, but if you could actually how to work with an innovation lab, that would be great.

The second part of this question is from Sierra Bursilo from the University of Western Ontario, who is a PhD student in a Canadian university, and who's wondering how to get involved with innovation labs.

Saharah Moon

Chapotin:

After the award is made, there will be a series of competitive calls coming out, after September, and so then a research partner could apply for one of those sub-awards, or join up with a research university in the US or elsewhere that is planning to apply and form a consortium for one of those.

As far as students, I guess I would say depending on the topic they're interested in, and now we I think have an innovation lab that addresses just the breadth of agricultural research for development, so I would say reach out directly to that innovation lab, find out if there are opportunities to align their research with what that innovation lab is doing, potentially take advantage of existing field sites that they're looking to do some research overseas, and then also look at the programs that are managed under our human institutional capacity development division, which do have some opportunities for students to engage in international agricultural research, either with our innovation labs or some of our other programs. And sometimes there is funding available to do research overseas, for example, or for international students to come to the US to do research.

Dr. Irvin Widders:

That was a very good question. At US universities, those of us that have experience in those environments realize that our research is largely conducted by our graduate students. The professor goes into the field, but it's the graduate students who day in and day out, night in and night out, are there in the lab or in the field doing the work.

We're always looking for graduate students that have specific interest in the areas that we're working. There is no need for a graduate student that has an interest in a particular area to come to the management office, to Muni or me. What I would encourage them to do is go to the webpages of many of our programs, look at our portfolio of projects, look at the scientists that are doing the work, and if there's an area that's of specific interest, contact directly the scientist, because it's with that professor, that field scientist, with whom you would be interacting and doing your collaborative work. And so that's the best way to get engaged, in my opinion.

Marga Lino:

Good morning. Thank you very much. Marga Lino from Haiti Renewal Alliance. I noticed that in reading your Caribbean analysis – that was very informative, so thank you for sharing that – because so many of the challenges around sustainability and scale-up in developing countries are directly related to infrastructure, what is your recommendation in engaging ministries of agriculture and maybe perhaps even ministries of health to pretty much take more responsibility in these capacity building programs? Because if it's not – if they're not engaged, how can it be sustainable? Because once the private sector or the NGO leaves, it's essentially – this great project is over. So how do you support the local farmers in kind of continuing that, and how do you engage the governments in that, if you do engage them?

[Background voices]

Dr. Irvin Widders:

The first thing that we were told is be cautious about engaging government institutions or political entities that don't have longevity. And there's a lot of truth to that. There are elections, changes in government. People turn over.

On the other hand, as innovation labs, we have worked with NAROs or NARs, if you will, our entire life. I mean, we develop relationships with people, staff that have commitments to particular areas. Maybe it's genetic improvement, maybe it's another area. I think it all begins with relationships. You've got to cultivate relationships with competent people in these institutions that aren't the politicians that are likely to have longevity, and build from there up.

Obviously, you need to get ministry buy-in. In the case of the Guatemalan project, we met with both the minister of agriculture and the minister of public health and got their stamp of approval and their ownership of the project. But it begins with those relationships, those people that you trust. There are good people in every institution, from my experience.

Muni Muniappan:

_____ even though _____ innovation lab, we have a sub-award to one of the NGOs. The NGO very closely works with the National Agricultural Research Council and the Extension in Nepal. We take those scientists, as well as their technicians, for training, and also send them to some of the international conferences. So we are working very closely with the National Research – Agricultural Research Council, as well as the Extension.

Julie McCartee:

We have another question from online, and also, just to mention that we had 85 online participants at our peak, which is really fantastic.

Marisol Pierce-Quinonez:

The question comes from Michael McGurr, USDA's National Institute of Food and Agriculture. Dr. Shaw said that new technologies are not reaching farmers. Since the land grant universities involved with the innovation labs are also responsible for extension, have you considered approaches that could integrate more of this outreach component?

Saharah Moon Chapotin:

You guys want to take that, or –

Dr. Irvin Widders:

USAID does fund a program that is looking at extension innovations and extension transfer, and I don't know if Rob or someone wants to speak to that. Clearly, the land grant model does integrate the three pillars of research, academics, and outreach, or extension, as you will. And an extension is a continually evolving thing. In the developing world, obviously, it's been the NGOs that have been doing much of the extension work, but my conviction is that long term, we really need to be thinking about models

where there are institutions, national institutions, public sector institutions in developing countries that assume that outreach role in terms of agriculture and agriculture technology transfer.

As you well know, in many countries, extension systems are either non-existent or dysfunctional or political entities that appear and disappear overnight. And so this has been one of the big, big frustrations, and how do we transition into stronger outreach institutions? Personally, I'm not optimistic that agricultural universities in the developing world are going to become land grant institutions after our US model. They're primarily academic institutions. I think they're wonderful academic institutions. I think they're becoming research intensive institutions. Most universities, agricultural research universities I know in the developing world haven't developed effective outreach programs yet.

*Sabarab Moon
Chapotin:*

Irv mentioned we do have a centrally managed program, the Modernizing Extension and Advisory Services Program run by University of Illinois.

Dr. Irvin Widders:

Yeah.

*Sabarab Moon
Chapotin:*

And that is actually a leader with associates, and it does work with missions to look at the extension services within their country, and to bring resources to bear on helping to strengthen them. And many of our missions are working on extension, and they're taking a very broad view towards extension, working both with existing public sector extension programs, with NGOs, but also looking to how the private sector can engage on extension.

So certainly, I think the lessons learned out of the US university model, and in fact, many of the missions are working with US universities directly, not necessarily through one of our innovation labs, on bringing in their expertise and experience on strengthening extension services in the country where they're working.

Dr. Irvin Widders:

One of the things I'd like to add which I think is very, very exciting is we're in a new era of technology. Technology transfer outreach is not going to be the same as my father experienced when he was a farmer, of a extension agent in every community. With cell phone technology, smartphone technology, we have the potential to get information into the hands of the – of smallholder farmers in rural communities over a landscape almost instantaneously.

One of the emphases in our program is the development of decision management tools that enable farmer to diagnose a problem and identify solution options, and then see how they can access those solution options. So I think technology is going to transform how we think about and implement extension or outreach.

Julie McCartee:

I saw a question on this side. I'll get you as well.

Rothrik Nabruk:

Thank you. My name is Rothrik Nabruk. I'm working for Conservation International. I have a question about perhaps the greater understanding of the integration of ecosystem services in agriculture production and the lessons learned coming from these innovation labs. I'm speaking of – there's many different ways that we can think of ecosystem services, very small scale, creating habitats for natural pest control, in the case of integrated pest management. You know, there's many different ways that we can look at the synergies, but also not simply in terms of agricultural production, but how farmers depend on perhaps natural areas for food, for collecting building materials, etcetera.

I know that with the new innovation lab, there is an increased focus – there's a component on natural resource management as part of the new innovation lab coming out. So my question now is is there a document or a research product coming out? What can we learn from all of these past innovation labs in terms of the synergies between natural resources, ecosystem services, and different types of agricultural systems? And not having separate documents for each innovation lab or each stream of research, but having sort of a collective document, where we can learn from that, and then apply it to the new sustainable intensification lab?

*Sabarab Moon
Chapotin:*

That's a good question. We don't have that right now. A couple of resources, though. Jerry Glover on our team leads our Program for Sustainable Intensification, and he actually sort of still has one foot in the scientific academic world, and in fact, is currently still publishing with collaborators both inside and outside innovation labs. So you might look some of his recent work that does sort of address these topics for more of a synthesis look, rather than what a particular output is.

Certainly as the SANREM lab is in its last year, it will be generating a synthesis of – you might look to see what products are coming out, given that they have had a ten year run. But again, that's focused on one innovation lab.

I will say this summer, we are going to be going through a series of kind of document analyses, strategies, so sometime next fall, actually, we might have something that's closer to what you're looking for, kind of looking across our Program for Sustainable Intensification more broadly, thinking about lessons learned and potential impacts looking forward.

And again, I think that's the kind of output that I would imagine, even though the Sustainable Intensification Innovation Lab is one innovation lab, it will be considering issues across the entire portfolio of innovation labs.

Muni Muniappan:

July 2013, the IPM Innovation Lab conducted an international workshop on biodiversity and IPM in Monarto, Indonesia, and there were about 80 presentations and about 200 participants in that workshop. And we selected some abstracts out of that workshop, and it is being published in the journal *Production*. You can have a look at it. Or if you're interested, if you give me your email address, I will forward that information.

Julie McCarree:

Another question from our online audience.

Marisol Pierce-Quinonez:

Yes. This question comes from Richard Tinsley in Colorado State University. How do you relate agronomic research that does a wonderful job determining what is physically possible, but says nothing about the operational resources needed to extend the small plot results across a field, farm, or smallholder community, taking into consideration that most smallholder farms have access to only have the kilocalories they need for a full day of field work, and restrict the workday to perhaps three hours of diligent effort? Does your dissemination pathways include the availability of labor or other operational resources, or continue the assumption that it's not a problem?

Sabarab Moon Chapotin:

I'll take a stab at that, but I'll ask you both to comment as well. I think that's – as we're moving forward with the scaling technologies agenda, and in fact, some of the research investments we are and will be making, those are precisely the operational questions that we recognize need to be answered if we're going to be effective at reaching farmers and enhancing the adoption of technologies. Obviously, it's not just the widget or the technology, but it's how it gets to them, what are the larger dynamics at play? And I think a good example of research that will be forthcoming is in the Sustainable Intensification Lab, there will be an element around mechanization.

And thinking about how you might introduce appropriately scaled machinery in areas, you can't do that without addressing labor considerations, looking at supply, gender – Rob points out gender, who's going to be using the machines, who's currently doing the labor, whose time are you trying to free up? So I think those are precisely the sorts of operational questions that some of our programs, the Cereal Systems Initiative in South Asia, for example, has done a lot of work around how you engage with farming communities, what are the models by which you them, and what are the tradeoffs related to – sort of in conservation agriculture, what are the tradeoffs related to feed, fodder, livestock, soil, carbon matter, for example, and then in deploying new technologies? Do you want to add to that, Rob, or Irv, or –

Rob Bertram:

Well, I think the big challenge we face is – and this is – of course, the scaling captures this quite well, is how to help smallholder farmers capitalize their enterprises. So the mechanization is a very good point. Another one of the

new innovation labs is focusing on small scale irrigation, which is quite related, actually, to mechanization.

But we are looking at issues, for example, around women's time expenditure, their caloric intake. There are issues and tradeoffs, as the questioner points out, and we are trying to take those into account.

We also have the Basis Innovation Lab that Saharah Moon mentioned in her remarks about asset management, and there, the focus is also on risk reduction. So it's kind of this – there's really a dual focus on this one. One is to try to reduce risks, and that can be through improved bean varieties, or better IPM management technologies, water availability, or crop insurance, index insurance against drought losses and such, on the one hand, with the access to appropriate capital, such that the returns to the limited land, labor, and capital assets of the communities we're trying to reach can start to put them on a path towards some generation of wealth, whether it be through livestock, whether it be through better storage capacity on a farm to ensure the better – the food safety of the harvest, or the price at the marketing – point of entry.

So it is a – it's a very complex set of things, and the Sustainable Intensification Lab is where it all comes together. But many of our innovation labs and other partners are trying to get at the answers to the points the questioner raised.

Dr. Irvin Widders:

You gave an excellent response. The only thing that I would probably add is that in many of the innovation lab projects, although if one looks at the output, it's something quite specific, but really, our research teams are quite multidisciplinary, and we've gained a tremendous appreciation for having socio-economists and others that understand these other dimensions, that are very important in designing technologies, and our host country collaborators, who understand the context in which a technology will be introduced.

I think this is one of the beauties of the innovation labs, and the value added that US universities bring to these activities.

Julie McCartee:

I think we have time for one more question, and I saw your hand go up before.

Paul Randolph:

I'm Paul Randolph with USAID Asia Bureau. It's kind of been covered in a couple of the other questions, but trying to pull together across all the different labs that are now ongoing and working, and with some of the labs that are now ending ten years' worth of work, one thing that I've noticed in other aid sectors is we haven't done as good of a job of tracking the long term evaluation and disseminating what are the best practices across a program over – you know, ten years is a nice timeframe, even beyond that. Has Bureau for Food Security – are you looking at a particular specific lab to look at kind of that evaluation and sharing that can go 5, 10, 15, 20 years out?

So – and we’ve heard about a couple of very interesting programs this morning, but what happens when you leave? That was one of the other questions this morning. What happens when you finish that activity? It seems like you’ve trained a lot of farmers to grow seeds, for instance. Do they continue to do that five years later? Do we have any type of lab that’s working on those type of analyses and dissemination of information?

*Saharab Moon
Chapotin:*

I think many of the labs are doing that themselves, attempting to capture sort of the lessons learned, both ongoing, and also at the end. We have done performance evaluations on each of the labs, either as midterm or final assessments, and those are available on the deck, or you can reach out to us to get them. But those are more focused on performance, not so much on the sort of outcomes and impacts of the programs.

So I guess that’s – I don't have a great answer as I can point you to a particular entity that’s doing that, but we are really trying to think about different ways to assess the impact of the research programs, and there’s a few folks on my team who are thinking about that, and recognizing in fact that the impacts of the innovation labs and the research and the knowledge that we’re generating is often going to be seen, as our Feed the Future value chain programs have impacts in the field, as KASON program over the next few years has impacts in Nepal, that’s where we’re going to be seeing the impacts of the investments we’ve made in IPM research.

And as the mission – so we’re looking for how to capture those impacts as they’re being kind of generated and created throughout the investments that both the agency is making in the field, but also other development partners are making, and then looking at how we can link that back to the research investments we’ve been making here. So I guess that’s kind of a – it’s a multifaceted approach, but it’s something we’re very much thinking about.

Dr. Irvin Widders:

Impact assessment is a long term effort. It requires good baseline data to start with, to know where you're starting. You're absolutely right that the best way to capture impact is 5, 10, and 15 years after a project has ended. It’s not only the innovation labs that are concerned about this. The CGIR in whom USAID invests is very much concerned about this.

Impact assessment not only tells you if you had a good return, and I think all the data that I’ve ever seen show that there’s an outstanding return on investment in agricultural research, but what can we learn? What has been successful? What has failed? How can we take those experiences and better shape our investments in the future? I think that’s what we gain.

Julie McCartee:

So thank you very much to our three panelists, to Rob Bertram, Carol Levin, and also the KDAD Agrilinks team, for putting together another wonderful Ag Center Council.