

BORLAUG-ROCKEFELLER: INSPIRING THE NEXT GENERATION

Panel Moderator: *Judith Rodin*

October 13, 2016 - 8:30 p.m.

Panel Moderator

Judith Rodin

President, The Rockefeller Foundation

Panel Members

Bram Govaerts 2014 Recipient, Norman Borlaug Award for Field Research and Application, Mexico

Andrew Mude 2014 Recipient, Norman Borlaug Award for Field Research and Application, Kenya

Charity Mutegi 2013 Recipient, Norman Borlaug Award for Field Research and Application, Kenya

Eric Pohlman 2015 Recipient, Norman Borlaug Award for Field Research and Application, Rwanda

Introduction

Catherine Swoboda

Director of Planning - World Food Prize Foundation

Good morning, everyone. Good morning and welcome back to Day 2 of the Borlaug Dialogue. It's great to see everyone today. We have a very packed morning, so we're going to jump right into it with the first panel that we've all been anticipating.

So last night was the big 5th anniversary celebration of our Borlaug Award for Field Research and Application, endowed by Rockefeller, and many of you were probably there. So this panel today, we are so pleased to have four of our recipients with us.

And so I am going to now invite to the stage Dr. Bram Govaerts, the 2014 Award recipient. And Bram is the Strategy Lead for Sustainable Intensification in Latin America at CIMMYT.

Dr. Charity Mutegi, who is the 2013 recipient, and Dr. Mutegi is the East Africa coordinator for the Aflasafe Project for the International Institute of Tropical Agriculture.

Mr. Eric Pohlman, our 2015 recipient, who is the Rwanda Country Director and Senior Partner at One Acre Fund.

And Dr. Andrew Mude, who joined these individuals last night as he was awarded the prize. He is a senior economist at the International Livestock Research Institute.

So we're very honored to have a special guest chairing this session with these four award winners today. And as all of you know, one of Norm's goals was to inspire the next generation. And he inspired so many others who have been in our World Food Prize Youth Institutes around the world, including myself.

And so, with that, it is my great privilege to introduce someone who is doing just that, and with that, introducing Dr. Judith Rodin, president of the Rockefeller Foundation.

Judith Rodin

Thank you so much, Catherine, and for all of your accomplishments at a young age as well and for your terrific future. And thanks to all of you for joining us for this, what will be a wonderful conversation with the Borlaug Field Award recipients.

Five years ago during the World Food Prize ceremony in 2011, I had the great pleasure of announcing that The Rockefeller Foundation was committing a million dollars to endow this award that of course carries the name of one of my great predecessors, Norman Borlaug.

I was privileged to get to know Norm just a bit and spend some time with him in the final years of his life after I had become president of Rockefeller. Of course, when I met him, he had already been awarded the Nobel Peace Prize, the Presidential Medal of Freedom, and the Congressional Gold Medal. His name had become synonymous with the Green Revolution of the mid-20th century. And yet in our conversations, instead of ever focusing on his accomplishments or indeed even focusing on the past, he was single-mindedly concerned with the future.

One of his most important personal goals in his later years was ensuring that future generations had role models, innovators and scientists who would continue the hard work of securing the global food supply. I think Norman Borlaug would have been very proud of the men and women who have earned this award bearing his name.

The Borlaug Field Award recipients represent four different continents, and their disciplines and accomplishments are just as varied. Their subjects range from plant diseases to agricultural technology to livestock insurance. They come from different backgrounds, they have different approaches, and they have found different solutions. But they all share the same qualities that Norman Borlaug embodied – innovation, persistence, and a dogged dedication to saving lives through science and technology.

They were all also given the award under the age of 40; in fact, we made that one of the criteria, because we believe that our winners would have long and distinguished

careers ahead of them. And one of their greatest gifts to the world will be demonstrating the importance of this work to others, just as Norman Borlaug did.

In the 1940s the Rockefeller financed his original trip to Mexico, and the wheat developed there catalyzed a Green Revolution across Latin America and Asia. A decade ago we helped launch the Alliance for Green Revolution in Africa to really advance and replicate that success for the African Continent. And five years ago we established this award as a way of honoring those who are on the frontlines of the fight to eliminate global hunger. And just like our investment in Norman Borlaug's original expedition to Mexico, it is an investment in people and ideas that will change the world.

I am delighted to share the stage and begin this conversation with four of the five outstanding recipients of the Borlaug Field Award, so let's begin our conversation.

And I'd encourage them to jump in. I will ask each of them a first question, but my goal here is really to encourage conversation among them. And, please, as I said, jump in – don't feel it's rude. Let's really get a conversation going. Let me start with you, though, Charity, because your work in protecting staple crops from aflatoxin outbreaks is very significant; and of course you were awarded the 2013 prize for that work. Do you think since then, since 2013 – let's use that as the starting point – the global agricultural landscape has changed in some fundamental way that recognizes the importance of aflatoxin outbreaks as a threat to our food supply? And if so, could you really comment on how?

Mutegi Thank you, Judith. For the sake of everybody, let me just sum up and say this. Aflatoxin is what I like to say is an agricultural problem with serious health consequences and of course trade. Of course, you know about immune suppression, stunting, affecting trade between the African countries and the EU countries. So we've really suffered with the aflatoxin scourge.

Since 2013, a lot has happened, not just because of this award, but there are very many initiatives and recognition by governments to take this as a serious problem. Remember, it's affecting a key staple. For example, in West Africa, ECOWAS has recently ratified an aflatoxin action plan; it has actually been ratified by the Council of Ministers. COMESA, the Common Market for East and Southern Africa, is taking a lot of interest in addressing the issue of aflatoxin's standards and trade and had a lot of support from the USDA FAS side. The East African on community is actually currently developing policy, but to enable some of these technologies which we are developing, finds a landing point, because there's no use of developing technology but because there are no supporting mechanisms – for example, policy, infrastructure – that help us move this technology from the benches to the farmer who needs it. So there's a lot that is happening within individual governments in many countries. Kenya, for example, is mainstreaming, is including aflatoxin issues in the strategic plan by the Ministry of Agriculture. National programs, like the Kenya Agriculture and Livestock Research organization, has put a

serious commitment into addressing post-harvest issues, including pre-harvest; I mean, aflatoxin is both a pre-harvest and post-harvest problem.

The CG centers are doing so much. I mean, for a long time issues to do with nutrition and health were not really in the forefront, but for the moment the CG has a whole research program dedicated to nutrition and health, and that is where the aspects of aflatoxin and other related issues are falling into place, and they're getting a lot of limelight, and the problem as well as the solution is being given the attention it so deserves.

Rodin You mentioned new technologies that are coming onto the fore that really are a part of the armamentarium of the fight against aflatoxin. And, Bram, you've worked in so many countries and really focused in part in your work on technology, in this case mechanization or the lack of mechanization, which clearly, as you say, contributes to low productivity in developing countries. Can you share then with us again, as you're looking now currently and into the future, successful and innovative models in mechanization and the use of technology in making a difference to farming communities globally?

Govaerts Yup, of course. Thank you, thank you, Judy, and thank you for the invitation. And thanks also for the Rockefeller Foundation for their vision, because 50 years ago it's thanks to you guys that Norman Borlaug started CIMMYT, so thanks a lot for that.

And I think having successful models is actually what is shown here on the stage; because, if you look at the different elements that are represented, the innovation comes with the aflatoxin work but also the work you're doing of reducing the risk-prone farmers. And that is a key. Farmers are trying to make decisions and trying to make innovations and harvest innovations within a very high-risk environment. And it's also within that that we need to make sure that those innovations get scaled so that we actually connect the research, which the CG centers here represent, that somehow represent, and that it gets connected to organizations like the one you successfully lead, Eric, so that we actually can set up innovation networks where farmers become connected one between the other and we harvest the inherent need for change that every smallholder farmer or lead smallholder farmers have. So in a sense also trying to get that information out when we scale out that technology and use that new information to generate better decision-making and decision-taking.

And specifically the example of mechanization you asked me about – Within the project we have in Mexico called MasAgro, the Take it to the Farmer component, what has been generated is let's say a pretty competitive space in which local blacksmiths and local workshops are working together to innovate farmer demand-driven innovation for machinery. And that actually made a complete change, because it ended up that farmers request machines

that are very flexible, that are multi-crop and multi-use because they need to use it in very different situations.

And by innovating and generating those multi-crop and multi-use into various operations with the same machine, you also open the possibility to generate service provision. So why not look at, let's say, an Uber for machinery for smallholder farmers instead of asking farmers to buy a machine – and use that same machine with sensors and information connection as an information point that can send back information to the cloud and can support decision-making and decision-taking tools.

We are convinced that it's more and more important that we work as a whole team here to turn data into information, information into decision-making, decision-making into decision-taking, and then decision-taking into application. If a farmer doesn't have the way to plan a scenario to say I have five dollars, five pesos, five rupees, where I'm going to invest it – is it going to be in a machine? Is it going to be in seed? Is it going to be in education of my child? What are the different scenarios the farmer can invest in so that he makes the best decision.

But also how can we generate successful platforms for public-private partnerships? And another example of that is the work we do with seed companies. In our sense, Arturo is here, represented, and he's leading that work in the MasAgro project where the R&D is done in the public sector, but it is given, together with capacity-building, through local national seed companies that again work together in a pre-competitive space, but then they go out to the farmer, they offer those products, and they differentiate through service to helping the farmer to make the right decision to incorporate the seed with the machine. And obviously in the middle, there is the agronomic system practice. And then around that, we need the right decision-making.

Rodin Well, we've talked so much at the top levels about data-driven decision-making, and what you're saying is at the very grassroots level, enabling data-driven decision-making produces so much more effective outcomes. And that is a really critical point, I think, as we go towards the benefit of technology and the future opportunities.

Andrew, you've used a different kind of technology approach but also harnessing the use of technology for the benefit of farmers, pastoralists in your case, thus far. Maybe you could talk a little bit about the technological innovations that you see critical to your approach and how effective they've been really for pastoralists in a very transformational way.

Mude Thanks. Thanks Judith for that question. Technology has been central to the work we do in a lot of different areas. So, for example, the type of insurance that we are providing and that is provided in these kind of systems in

pastoral areas that we work, is one that requires a specific type of innovation in insurance, which we call “index based.” And so the application of it in this area has used satellites that read the amount of vegetation on the ground of a time and space where it’s freely available, satellite data that has high resolution. And this is what the satellite data provides, gives a reading of the state of health of the rangelands. And because of these systems, the health of livestock is primarily due to the amount of forage that’s available and creates a great link and a great predictor of livestock health and mortality.

And however, satellites, the reading of the satellite, for example, there’s a challenge there in the sense that the satellite tells you how much green, how much vegetative vigor there is on the ground; but it doesn’t tell you how nutritious that green is – how palatable is it for livestock? And when you have circumstances in some areas, you have invasive species that are coming on that appear to be green but are not very palatable. And so one question is – how do we deal with this?

And we can deal with this with econometric techniques, with techniques in remote sensing. But it only takes us so far, and so one of the new technological possibilities that we are investigating, along with our colleagues at Cornell University, is trying to leverage the fact that in these areas pastoralists themselves, first of all, network, cell phone network coverage is getting to be fully available. The density in this area is increasing. Pastoralists themselves are using smartphones, basic smartphones, been able to use it.

So we have initiated a process where we’re trying to see if we could get them to..., if we could crowd-source ground-truthing by developing applications in which pastoralists take pictures in certain areas; they are incentivized to take pictures by providing them a small, ten shillings, about ten cents, now for every picture they take. If you want them to go into areas where you don't have that much information, you pay them a little bit more. And our research shows that they respond to these incentives. So in a pilot we did last year, in the space of about five months 120 pastoralists... Most of these were illiterate pastoralists, but they’re able to use their phones.

They sent about 120,000 photos up into the cloud. And so, working together with Cornell’s Institute of Computational Sustainability, they’re looking at this. Each picture was taken with some information, and so they’re trying to use big data analytics and so on to provide a filter that will be able to tell us – well, this green we’re seeing, how good is it for livestock? For what livestock is it better? And that will help us, for example, increase the precision of the index contracts.

And one of the fundamental requirements of a successful index insurance program to go to scale is that the contract is actually insuring the risk that you’re trying to cover. There have been many instances... Index insurance

has been around for about 20 years, and it has received a bit of a bad rap, because in some instances, when the providers have not been very careful about how they design, there's a lot of backlash.

And so we have seen that in some countries where farmers were up in arms and the government support them against organizations that might have provided contracts that were not so carefully designed, we find that they're completely in a sense thrown the baby out with the bath water. And so in these areas farmers now do not have the benefit of this important technology to carry out the risk that they face, which is really a damper to their incentives to invest, you know, if it's crop farmers, to invest in hybrid seed, to invest in good fertilizer, and so on and so forth.

If I may, another area that we're really getting into with regards to technology is training. One thing that is important, not just for herders and insurance but for a lot of the technologies that we're all working, is to make sure that the constituents that we are serving, or we are providing these technologies to, really understand what it is they're getting. It's important to build their trust so you can create adoption. But the cost of extension, of providing learning to the farmer or to the agent – let's say in our case the insurance agent or the extension agent – is extremely costly. You have groups of scientists or development practitioners who go out. They train the farmers or their representatives, they leave, and a lot of work in instructional design or education are showing that that's not the best way for people to learn.

But now the fact that people, most people are using smartphones, for example, this work in nexus of instructional design and mobile learning, which can utilize various techniques, gamification, game-based learning, and we have done a small pilot with one of our insurance companies where we gave a subset of our agents a small mobile-based learning, now two that were developed. And we find that relative to the normal methods of providing extension, agents who receive that improve their comprehension twice over and also their sales of insurance about three times over. I think it's still early, but these applications have benefits way beyond insurance.

Rodin This is wonderful. Thank you so much for those examples. Eric, the One Acre Fund is a system-based model that really tries to attack and integrate an approach to helping farmers increase their outcomes, be more productive, be more successful, and use all of the resources available. Some people might be familiar with it, but can you describe the model and how you've used it both in Rwanda and of course across East Africa?

Pohlman Sure. Thank you very much. It's a real pleasure to be here and with such an esteemed panel. It's awesome, and it's inspiring for me to see so many cool innovations really getting out to farmers.

Yesterday there was also an amazing panel that Sir Gordon Conway led, and I thought it was quite fitting that there is a knight, a doctor, an ambassador, and it was the farmer who stole the show. And Monica, that farmer, expressed a problem that is exactly what One Acre Fund is trying to solve. She said, "I need Striga-resistant seed. I need some reliable source of fertilizer. I wouldn't mind a training or two." And it should frustrate this room that that is still being expressed on this stage.

It comes to delivery, delivery, delivery. How do we get those things? There are amazing minds and geniuses here, people who spent 30 years breeding Striga-resistant seed, here in the audience, fantastic minds. And the challenge is – how do we get it out to farmers in certain areas. We've done a great job in different areas.

So what One Acre Fund tries to do is exactly that. We package together a service bundle that includes delivery, so an amazing logistics team and field officers and teams that get these physical inputs out to areas where they haven't gone before. We understand that farmers need financing; they don't always have money at the beginning of the season to pay for these services, so we provide credit for nine to twelve months where farmers can pay slowly to access that.

We bundle that in a training. You know, sending out a technology without how to use it is stupid and dangerous and not really a good idea, so you have to bundle that with technology. People don't know how to use an improved seed or how to plant it or properly space it. They're wasting. They're just throwing money away. So we train farmers every two weeks on different practices throughout the season. We have an amazing team of 2,500 field officers who are from the communities that they work in that are there guiding farmers along the way.

And then at harvest we work on storage solutions that allow a farmer with their increased inputs to access a little bit better market, take advantage of some price fluctuations, and have confidence that they're able to store it in their home. That's kind of the model in a nutshell.

Rodin ...what each of them has said, a real example of seeing the farmers as partners, not as beneficiaries. And that's not just a linguistic twist – that's really informing a way of working that I think is so fundamental to the way each of you is thinking about your work – because you understand the local knowledge is important, you understand that empowerment of the farmers is a critical piece of achieving the success that we're all aspiring to; and you understand that they have the capacity not only to inform you and your work but to inform one another. In some ways that will be the only way that I think we will get all of this to scale ultimately, no matter how many resources we invest in this. And it's very powerful and really, really very impressive.

I'm going to move on to the question of food loss, because I think in pieces of what each of you may be doing but very evident in some is the question of how you protect what is produced. Obviously, insurance models protect against weather. But I want to drill down on some of that in a deeper way.

And, Charity, I'm going to start with you. I know that you've been concerned, and I think appropriately, that thus far a focus on food loss has tended to be about the quantity of food which is getting wasted, rather than the quality, and obviously aflatoxin affects storage in a very significant way. Can you talk about that issue and how we can be paying better attention to it was we start to focus more on the issue of food waste and loss?

Mutegi Thank you. You know, I like to ask the audience this, and in every respect for breeding, because it has an extremely important part to play, and no doubt about it. But how do you reconcile with the facts that you have successfully bred for crops, for disease, you have increased yields by probably 30% or more – and the farmer with all that produce ends up incurring 40% of post-harvest losses. Are we really solving the problem? Really?

So I think for a long time the issues about post-harvest process were not given the attention that they deserve. But recently that is changing. Whether it is at government level, whether it is with the bigger, the wider CG centers, there's a lot of focus being given to the issues around post-harvest losses. Policy issues that are coming back.

But I think one of the important things that is happening is looking at agriculture from a complete value chain approach. We're not increasing yields, but we are also looking at the end of the chain. How do we extend the shelf life of this produce? How do we link our farmers to markets? Those are very important things that have been raised.

Aflatoxin issues and, like I said, is both a pre-harvest and a post-harvest issue. There has been a lot of attention now to address the post-harvest issues by dedicating resources but also developing teams that address the post-harvest issues. Beyond aflatoxin, you talked about losses in terms of fruits and vegetables, the highly perishables. So I think for me the joy is seeing that there is a lot of focus that is now being put into addressing the end of the value chain, which is the post-harvest losses.

Rodin Bram, can you jump in?

Govaerts Yeah, if I may add to that. I think it's very intriguing how we can through the post-harvest problem actually apply the same model of integration of the science with the scaling. And it's very important that we look at post-harvest not only in volume but also in quality, that the effect of having a good post-harvest management is affecting the quality of the grain.

And it's in that sense, indeed, I also agree with what Charity said. It's looking at the full value chain; and, in order to do that, making it more traceable, making it more transparent is going to be key. If we can then travel the data with the grain and that that data goes with it and it shows, was the grain socially, sustainably produced? Was it well preserved in post-harvest? And how is that having an impact on health? Is that having an impact on nutrition. Is it having an impact? Then we can really generate, let's say, a pull mechanism in which we first of all make sure that farmers can produce enough food, nutritious food and healthy food for their family and then connect them to the market mechanisms and show and tell the story all the way down to the consumer. And that is I think a key piece that we need to be thinking about, that here in the room, how do we bring those things together?

So it's again demanding excellence in science so that also the post-harvest solutions that are promoted, we cannot accept that there are solutions that are promoted which in the end are not the real solution. And it's sometimes the difference between a very small element.

And let me take an example. You can get storage silos, and those storage silos for smallholder farmers will protect the grain from rats, from animals that can eat it. But if we make those same storage silos air tight, at the same time it will protect against other diseases, microorganisms, fungi. Because you take the air out, and the microorganism consumes the air, and then it basically kills itself – right. So that same storage solution looks exactly the same. But if we don't make it clear, if we don't assure that that solution that is coming to the farmer actually combines to the maximum what we can do and what we can bring together to a sound excellent science and then connect it to the outreach programs and mechanisms that we have. And at the same time, I'm going to repeat again – how difficult can it be to put a small sensor into that post-harvest storage silo that measures temperature, that measures the humidity, but at the same time that becomes a network. Because if we can come, bring together those small, off-field storage facilities, can bring them together in a network, and that can be connected to the next stage where you can bring the grain together, and that can go to the market, then we are again generating an innovation network. And I'm more and more convinced that change is going to come from innovation networks and the enabling tools to make that happen.

Rodin Fantastic. Jump in.

Mutegi I'll jump into what he said. A lot of people are thinking about post-harvest technologies, but the issue is cost. And I will give an example of aflatoxin.

Many people have advocated for rapid testing kits to address aflatoxin problem. And many people have suggested probably we need to give farmers a rapid kit so they can test for the amount of aflatoxin. The question

is – this is a farmer... And by the way, aflatoxin, unlike other issues, does not really affect yields. It is the quality and the health implications, and it has chronic implications.

So this farmer has continuously eaten aflatoxin-contaminated food. They're not dying. They are living for long. They're not aware about the chronic implications, so they're okay. Now, you're giving a testing kit to a farmer and telling them, "You need to test." So, okay, I'm a farmer in Makueni, a very food-insecure place. What do you really expect me to do with my maize when I find that it's contaminated – to throw it away? No. Yeah? I mean, I'll argue that I didn't die when I ate it. Why should I not eat it now and live for many other days. Why are you telling me to throw away my grain?

So the question is: We are developing technologies – who are we targeting for the benefit of the farmer with this technology? That kit is probably better off higher the value chain with a trader, with a manufacturer who shall aggregate the maize from the farmer, test it, and make a decision. In that way, they're developing a demand for safe maize, and ultimately the farmer will produce that clean maize.

So as we develop technologies, even for post-harvest or for any other technology, we must target the right people with these technologies. Very important.

- Rodin Eric, your model is focused on maximizing incomes, and clearly this is a key component of income loss, so how do you focus on this?
- Pohlman Yeah, and it's an important question. There's nothing more discouraging than having worked so hard to produce a yield and then that getting infested by weevils and seeing those weevils crawling around in your maize.

I think there's two approaches to this challenge. On one hand, you can aggregate and professionalize and put down infrastructure. And on the other hand you can think about what is a solution that would work for every farmer. And there are I think cases that one or the other is more appropriate. If you take more perishable items, I think you have to professionalize, you have to put in the infrastructure for crops that are more perishable.

The downside of that approach in a smallholder context is, you go from a hundred eyes or a thousand eyes or hundreds of thousands of minds that are watching their harvest and taking care of it to one guy who's managing a silo – and you aggregate that risk. So he better be really good at his job, because the food security of that village or that sector is in his hands. And it's not easy. It takes fumigating, it takes monitoring, it takes those sensors to make sure the moisture content is right. So I think that approach... And then there's a cost question, to Charity's point on the infrastructure costs.

If there's anyone here from Purdue, we have a huge debt of thanks to Purdue. They innovated something called a PICS bag, which is something that Bram was talking about a little bit. It's a hermetically sealed bag, come in 50 kgs or a hundred kgs, and it's more effective than insecticide dusting or anything else in preventing insects or other things that might spoil a harvest. And we've had...

Rodin So that's on the farm before it ever gets to the silo.

Pohlman Yeah, on farm.

Rodin Which is a whole new dimension. Right.

Pohlman It's on farm. It's super simple. It's really easy to understand. Farmers get it. It's a high-demand product in our package, and we're really excited to be offering it and having a good solution that leverages all of the farmers in the network. And then you can think long term about those bigger investments and bigger infrastructure projects that connect more to a larger market or might be more appropriate in more perishable crops.

Rodin So, Andrew, let me ask you how and if insurance-based models could play a role here or whether you want other interventions that approach loss, such as the three kinds of approaches we've been talking about, or is there a role somehow?

Mude So as you asked the question and the others have been talking, I've been trying to think what the post-harvest loss analog in the extensive life systems that the work is. And I think you gave the answer in your question to Bram when you said, in the end, the aim is to maximum the income or the welfare of the farmer.

And so for these livestock keepers, when we think about how do we maximize their welfare, in this system where, as I said before, risk is pervasive, so the first thing is – how do you build their resilience? How do you stop them from losing their livestock? And that is essentially the question or the problem that insurance aims to solve.

Although, of course, you listen to them, and our model actually evolved through a lot of interaction with the farmers, the livestock keepers and the request from them saying, "Why are you intervening after our livestock die?" Because the first type of contracts that were developed were what we call asset replacement contracts, so we could think of it was livestock life. And these contracts paid when, you know, drought had hit, livestock had died, and so the objective then was to provide you with indemnity or some payments to allow you to rebuild your herd.

As a result of interaction with the pastoralists, their representatives and their request that you try and intervene before... – well, I don't know if this is a

post-harvest loss, but before the loss of their livestock – we began then to develop what is now the dominant product that is being provided, which is an asset protection. And so it provides them with indemnities in advance of loss, and they then use that... The idea is to use that to purchase feed and veterinary support, water, anything that can help them to protect their livestock.

But then the question is – well, in these systems, how good are the markets for feed? And how nutritious are those feeds? And how costly is it to get it to them? Because in these extensive systems, the markets are not really as well developed. These are areas which are sparsely populated, don't have the road and other infrastructure networks to other areas. So this is part of the comprehensive set of questions we have to ask when we think in the end of – how do we minimize the loss in their system? How do we ensure that they can increase the income and welfare from the production system that is available to them?

Rodin Let me ask one last question and ask you each to answer briefly. You've won this award for field research. You're very close to – and we can hear this in your answers – to the field and applying some extraordinary innovative techniques to what you're doing. Year after year, we all go to conferences like this, and we hear amazingly interesting ideas, and yet many of them never get to scale.

So if you had a kind of magic wand and you could suggest one thing that would be necessary to take the innovations that we're seeing and really scale them in an effective way so that we could five years from now say, "Gee, we really have gotten to scale," what would it be? I didn't prepare them for this, so I'm going to give them a minute to think. Who would like to go first?

Mude Well, I can try, but not only myself but my institute, the International Livestock Research Institute, has been thinking a lot about this. And recently I know there's been a discussion about trying to create a specialized department that's still in progress but may be called "Impacts to Scale." And the reason is because... And I think my fellow Borlaug Field Award winners might say this. And I know reading a lot of Borlaug has written, there is a bit of a sacrifice for a scientist to really turn the attention to what is required for scale.

There are a lot of conversations, a lot of, as you said, interaction with the farmers but not only them, the whole suite of players that are required to really make sure that these products go to scale. You're negotiating with commercial players, you have to learn how to navigate the political divide. And this takes a lot of... In the end, you're almost forced to become a Jack of all trades, and you then might erode of your mastery of one and the science you developed.

And when I started in ILRI, I remember some of my colleagues will talk about “publish or perish,” and of course we must public and we must focus on evidence-based science. But if we are turned toward spending a lot of time in the complex process of scale, then you lose a bit of that. And so I think where this impacts the scale, what is required is a new orientation or a new curriculum, a new type of professional who understands the science but whose incentives are oriented towards scale.

There’s still a lot of debate of this within, I know, ILRI, other CG centers. And I think if we can work on that, if we can think about developing a new curriculum or a new type of professional system that really provides the right incentives to act as the boundary spanner between really strong science and evidence and then all the other, the farmers and the other players that are necessary – would be one way to go.

Rodin Anybody else want to jump in? Bram.

Govaerts If you really would give me a magic wand, I would make the human species better at teamwork so that we can really work together in an interdisciplinary fashion. And the other thing I would do is make a scientist a little bit less afraid of releasing the illusion of full control. Because if you can listen to all of these interventions here, exactly what Eric said, it’s about distributing the risk on thousands but at the same time harvesting the innovation of the connection between those thousands and then bringing that to again the thousands which are the consumers and the families. And basically then it all comes together.

So if we could combine those two traits, I think we would already be making a big jump.

Rodin Charity, you want to jump in?

Mutegi Really, it’s very hard to give one submission, so allow me to give a couple.

Rodin We’re running out of time...

Mutegi Okay, very quickly, very quickly. You know, first of all, I would present a very good constituency here, which is the woman here. And Kofi Annan once said, “Empowering a woman is one of the strongest development tools.” Yeah, that’s the broader context.

But I want to bring something to the group that we have here and ask ourselves. In this room, we are presented by politicians, we have academia, we have policymakers, we have potential leaders of tomorrow. And the question I want to pose to you – when you get money, for example, from Rockefeller, billions, millions, and you spend it, at the end of the day, what legacy have you left behind?

Now, many of us know Mahatma Gandhi for many right things. Right? And he came up with something that we call the seven deadly sins of the world. I'll give you four, give us four to think about. The first one is – Science without humanity. The second is – Knowledge without character. The third (we have seen this in this room) is – Business commerce without ethics. And the fourth one, because I believe we have policymakers and politicians, is – Politics without principle. You ponder that and you'll get a solution.

Rodin Eric.

Pohlman That was beautiful. I think the business without ethics is something that I would want to underline. Immediately when you asked the question – how do you go to scale – I thought about, well, you need a replicable model. You need a revenue generation where people are paying for it. But what I underlined in the end was you need an incredible team. And Andrew in his speech last night talked about “standing on the shoulders of a great team” and that it would have taken him ten minutes to talk about all of the people that helped bring this livestock insurance to fruition.

And I think that the real key to scale is – how do you inspire a group of people, how do you work teamwork, how do you work with that group of people in order to reach a large number of farmers in this case. So business with ethics in that sense is a good way to say that.

Rodin I am so inspired by leaving the future in the hands of this generation. Please join me in thanking the Borlaug Field Research Award winners.

Ambassador Quinn

President Rodin, thank you for making the Borlaug Field Award possible with the one million dollar contribution five years ago. I think everybody can see that it's paid off really well. These four winners and Aditi Mukherji, they have a new place in that next generation. Thank you so much for what you've done.