

**LATIN AMERICA'S ROLE IN GLOBAL FOOD SECURITY: THE INTRICATE LINKS AMONG
CONSERVATION, TRADE AND AGRICULTURAL PRODUCTIVITY**

Panel Moderator: *Ginya Truitt Nakata*
October 18, 2017 - 3:40 p.m.

Introduction

Cynthia Milligan

Dean Emeritus, College of Business Administration, University of Nebraska-Lincoln and
President and CEO of Wood Stieper Capital Group

Would the Latin America panel please come up? So this next panel will discuss the unique role that Latin America as a supplier of food and the intricate links between agricultural productivity, conservation and trade. The panelists will share their insights into why investing in sustainable agriculture is a key to feeding the world and to mitigating climate change.

Did you know that Latin America contains a third of the world's arable land, a third of the world's freshwater resources? The region produces 60% of the world's soybean export, 45% of the coffee exported; and the region is also the supplier of 44% of beef exported globally. And the region is a global leader in no-till farming. And it was the first region to meet the Millennium Developmental Goal of cutting hunger in half by 2015. But challenges remain. Agriculture drives 70% of the deforestation in the region, which is occurring at three times the global rate.

So let me introduce to you the panel moderator, Ginya Truitt Nakata. She is the Lands Director for the American region at the Nature Conservancy, and she has over 25 years of experience in international development, especially within agriculture and food security. We're looking forward to it.

Panel Members

Ginya Truitt Nakata	Lands Director: Latin America at The Nature Conservancy
Dr. Bram Govaerts	Regional Director for the Americas, International Maize and Wheat Improvement Center (CIMMYT)
Victor Villalobos	Director General, Inter-American Institute for Cooperation on Agriculture (IICA)
Ruben Echeverria	Director General, International Center for Tropical Agriculture (CIAT)
Priscila Vansetti	President, DuPont do Brasil
Juan José Molina Echeverry	Veterinarian and Rancher, El Hatico National Reserve; Center for Research on Sustainable Agricultural Systems (CIPAV Foundation)

Ginya Truitt Nakata
Panel Moderator

Good, thank you. Can everyone hear me? So I just want to start by asking a very brief question here. How many people in this room speak Spanish? (Ah muy bien hagamos hablar en Espanol, esta bien?) Oh, no, okay. Well, maybe next time around we hope we can do an entire session in Spanish.

Thank you for joining us. I would like to just take a moment and thank my co-conspirators in organizing this panel for the Borlaug Dialogue. In addition to the Nature Conservancy, my organization, the Inter-American Institute for Cooperation on Agriculture, as well as I'm running another organization, Global Harvest Initiative – our main supporter helped us to organize this panel, so thank you very much for that.

Let me introduce my panelists to you. Right to my left we have Ruben Echeverria, he is Director General of the, you know I always say it in Spanish forgive me, the International Center for Tropical Agriculture, or CIAT, followed by Priscila Vansetti. She is the president of DuPont do Brasil. We have Victor Villalobos, also the Director General of the Inter-American Institute for Cooperation on Agriculture. Juan José Molina Echeverry – he's a veterinarian and rancher from El Hatco National Reserve in Columbia. And finally, Bram Govaerts is the Regional Director for the Americas of the International Maize and Wheat Improvement Center.

And so, since we have so many panelists and so much to say, we're all going to be very brief, and we hope that we really trigger your interest and that you come look for us after this panel, in case you should have additional questions. So let me just check my use of technology here. Very good, so there we all are.

I want to just go briefly, before we open the panel, into why Latin America and why we look at this from a global food security perspective. So as was mentioned, Latin America is a global Ag powerhouse, critical to global food security. And let me just give you one example to put that in context.

China is home to half of the world's pigs, and those pigs are fattened on Latin America soy. And it's also a region that's considered capable of doubling agricultural output by 2030. So when you think of Latin America, it's really important to think about how it really supplies the world.

However, this productivity as a region has also come at a cost, and so, for example, it's home to six out of ten of the world's most biodiverse countries. Right? At the same time 70% of the soil is degraded. As was mentioned earlier, deforestation is occurring at three times the global rate. And the region as a whole contributes over 30% to global greenhouse gas emissions. It is home of the Amazon, and as the old saying goes, "When the Amazon sneezes, the world catches a cold." Right?

Finally, in spite of all of its productivity, undernourishment is on the rise. It went up by 6% in 2016, and that means that 22½ million people can no longer meet their daily caloric needs.

So that is the question that I have for my panelists. How do we balance the need to increase productivity in order to feed the planet with conserving the very resources that support that productivity? So let's start with Ruben. Please, go ahead.

Ruben Echeverria

Thank you. It's a pleasure to be here. Thank you for the invitation. I think we are as excited with the CRISPR-Cas technology here in the Latin America panel, because it has never been an opportunity as today to invest in agriculture in Latin America. Particularly because of this huge dual challenge, how do you balance, for a hundred years Latin America has been producing all of these foods, produces as you just said, more food than the U.S., Canada, Australia, New Zealand all combined. And at the same time we have been exporting the water and the biodiversity and the natural resources like soy and all that.

So a quick answer, how to... Clearly, we are not going to be able to continue for a hundred years the same way. Forty-four percent of the deforestation of the world is explained by Latin America since 1960. That's over 150 million hectares. That's about 8 Iowa's. So obviously we will not be able to continue that production/increase through destroying the environment. So one of the reasons why I'm very happy to be back in Des Moines is because I work in the international agricultural research, and I think that by sustainable intensifying, by doing much more investments in agricultural research, in infrastructure, and hopefully in the right policies, we are going to be able to balance that huge role of combining the food production, food security, and also the environmental challenges.

In addition to those two, we have climate change hitting very hard. It never happened in the last fifty or a hundred years, and now we have climate change upon us, which all the land degradation, all of this is even accelerated because of climate change. And for the first time in about 20 years, poverty and malnutrition in Latin America is increasing again. So we were very happy, we work together in the Inter-American Development Bank a long time ago, and we're very happy, because poverty.... now is going up again. So I think by a substantial investment in agricultural research and technical assistance and infrastructure and policies, that combination there, we'll be able to balance this.

And if I have one more half a second on my three minutes that I was allowed... When we talk about Latin America, don't think about it as a homogenous, it's the most heterogeneous place that you can imagine. So all of this production that we are talking about, or 75% of this production is coming from three countries – 48% from Brazil, 14% from Argentina, 12% from Mexico. So that's 75% just in three countries, and the rest maybe food importers or independent [inaudible]. So it's a huge heterogeneity of who produces the food that we're talking about for the first challenge, which is – continue producing the food for food security

Now, if you are in Latin America, you are a little selfish, and you may not be thinking about producing food to save the world. So for me, agriculture is a business, and it's the commercial sector, it's the private sector plus research, and other good combinations there that could help balance this dual role of producing more food without destroying the environment. Thank you.

Ginya Truitt Nakata

Thank you. Priscila.

Priscila Vansetti

Yeah, so Latin America, I think, its natural mission is food production – we know that. We don't talk just grain, right? We talk grain and talk sugar, energy; we talk energy crops. We talk fruits

and vegetables, fresh fruits and vegetables. We talk, you know, cellulose. We talk a range of things and I think it's the natural mission that the region has.

It's also, as we said, 28 or 30% of arable land is there, fresh water, 30% is there. But also I think there is a "can do" attitude. There is an entrepreneurial spirit. There is some vision that I think the countries have had in investing in pragmatic productivity improvement policies. In research, I think I agree completely with you, is key to the future. I think not just research funded by governments, like we've had great examples, Brazil, for example with the Embrapa, which I think has been doing wonders for the country for improved productivity, improved sustainability, but also partnerships between the private sector and the public sector.

And I think we were just here at the CRISPR-Cas panel, and I think a lot was talked about there. How can we collaborate to solve the two problems? I would say, well, a problem and opportunity. You know, expand the opportunity that we have, because we have fantastic natural resources that we can build upon. And how do we partner to also solve some of the challenges? And I think our natural mission of food production can also really create wealth. It can reduce poverty. It can... If you look at all of our sustainable development goals, you can check each one if we do this right. You can check absolutely every one of them if we do this right. And I think there is quite a lot of willingness to get it done, and I think it's not just by people in Latin America but by the global community. Because, agriculture is local, but really the impact is global. The food production, I think no nation is an island, as we all know, and so I think it's an opportunity that we have, everyone, you know, together.

Ginya Truitt Nakata

Victor.

Victor Villalobos

Well, thank you. First, thank you very much for inviting me to participate in this panel along with these excellent panelists.

We saw in one of the slides that Latin America is playing a more and more important role as a food supplier for the rest of the world for solving specific problems. In fact, some leaders in the region, particularly in South America, they considered that the region will become bread basket for feeding the world in the near future. And there are some reasons. There are some arguments that we can bring in order to support that assumption. Due to the time, I would like perhaps to raise only two of them.

One is human capital. We have very good farmers – in fact, we have one farmer here; he will chair with us how good things he do in Colombia – good farmers that understand how to comply with the rules and regulations in the international markets. They are good to compete there, understand those rules and regulations, and they are incorporating technologies in order to be more efficient. In that respect, they also recognize the importance of the adoption of agriculture to the climate change, for instance, which now we see that more often in multiple countries, mechanisms and technologies to better handle soil conservation, for instance, or better technical systems for irrigation, and also how they can handle pests and diseases. That, along with the support of the national programs and the ministers of agriculture, they are able to reduce the use of chemicals, using science and technology, so pest and disease control, not just only for the country but also along with the support of the regional international

organization, they are now willing, and they are monies to have regional mechanisms to control the seasonal pests at the regional level, which is very important.

It is also an important to recognize that these mechanisms, to reach, they have access to technologies. They rely on the other element that I would like to bring, which is the national research institutes. Most of our countries, they have national research institutes, and they are playing an important role along with the farmers and private sector that respect they are accompany, the mechanism process which can improve the productivity with these national research institutes. And you mentioned Embrapa in Brazil, the INTA in Argentina or INIFAP in Mexico. There are good examples how the combination of these research institutes with the funds being provided by the federal government and private sector, they are now incorporating new technologies and innovation in order to make them more efficient.

However, I think one of the constraints, one of the challenge here is that this support is not distributed in all the farmers. And so it is important now to consider that we need to have this assistance, these extension services, these companies in bringing technologies to the farmer, to the less-developed and the poor farmers, which is the highest proportion. So it's the space that we have to work, not just only with support of the government but also the research institutes. In that respect, the international centers play an important role, because they are working with the less-developed and the poor farmers.

And finally I think it's important to recognize that the region needs to increase productivity. In that respect, there is a lot of room, which we have to recognize the proper and adequate technologies in order to do that in such a different and diverse agriculture as already was mentioned in which we have to have specific technologies for different agricultural conditions.

Ginya Truitt Nakata

Thank you, Victor. Juan José, from your perspective, how do you balance, on your farm those two needs?

Juan José Molina Echeverry

Thank you for the invitation. In my case, I think it's really important to turn agricultural practices into a sustainable way of production. And basically I would like to share a particular experience in Colombia in our family project where we have livestock production and changing into simple pastoral systems, giving really good importance to trees. In their productivity system we have been able to increase our biomass production, not only in quantity but in quality, which has allowed us to increase productivity. We have been able to double the loading capacity of the systems. And in terms of milk production per hectare, we have been able to double the productivity. So this shows us how, with sustainable productions, we are able to conserve and also increase the productivity in Latin America. We have to favor the biodiversity systems because it will be like one of the main options to become resilient to all these climate change effects.

Ginya Truitt Nakata

Bram.

Bram Govaerts

Thank you, Ginya, and first of all, thanks for inviting me to share on this panel with such distinguished panelists who were, and Victor, mentors of several things that we have been doing in Latin America. And I think asking the question, there's only one way to respond – Like any agricultural question, it depends – because Latin America is a very diverse continent. But I think that “it depends” also can be summarized as we need to look at resilience of the systems; and to do that, we need to introduce system thinking.

I think it's time to bring agri-food systems to Latin America that can guarantee nutrition, nature conservation and national and international security. If we go for agri-food systems that can preserve and provide nutrition, that indeed means it's not only about volume but it's about making sure that from the field the right nutritious elements are generated that will be reflected in what the consumer – and the consumer can be a farmer or somebody living in the city – will be eating and consuming later on.

In order to do that, we do indeed need to take it to the farmer, rather, innovate it with the farmer and vertically integrate, let's say, science and knowledge, national research systems but also traditional knowledge from farmers and innovate from there. But I also would like to describe here to take it to the consumer and innovate together with the consumer so we can generate a real pool for sustainable agriculture and which through big data systems we can have data travel from the field all the way down through the value chain, supporting data, supporting the decision support systems but also communicate that to that consumer so he can then make a better informed decision and that way vertically integrate.

It's a bit like what we're doing, thanks to an investment from the Mexican Government in the project we have in MasAgro, where 300,000 farmers are now innovating on one million hectares with new knowledge, new seed, new production systems like conservation agriculture, but also where we are generating now a platform for public/private investment towards the pool for sustainable agriculture. Agri-food systems for nature conservation – that obviously means that we have to give value to biodiversity but also that we have to generate a system that can optimize production, yes, but also can look at the farmer as the system thinker in excellence and in essence that can actually serve landscape preservation, that can actually work with natural resources.

It's no surprise that, when we look for farmers and start thinking in their system elements, that also brings us to agri-food systems for national and international food security. If we can reduce the gap between those that know and don't know, those that have and do not have, we can reduce risk and we can reduce conflict in the world.

In the end, it's about business continuity for the planet, business continuity for a country, but also business continuity for the farmer family and its wellbeing. Like Borlaug said, “No peace on an empty stomach, no wellbeing on empty stomachs, no happiness on empty stomachs.”

Q&A

Ginya I'd like to just take the panel back around to pick up on a couple of those topics that you introduced. So, Priscila, particularly looking at DuPont and the work that you do in Brazil, one of the things we know about Brazil is that of all the countries in

Latin America, they invest more in research and development. However, it's still only about half the rate of the OACD countries, roughly; and so it's not where it needs to be, even though it's high compared to the others. And this is a potential impediment to some of the key work, the key investments that need to take place there.

And on top of that, if we coupled that with some of the subsidies, particularly in Mexico and other countries and you look at how those are targeted, they're not targeted to supporting farms like El Hatico; they're targeted to more of your traditional, more of..., you know. And so looking at just kind of those two elements, what is it that DuPont, like if you could give your recommendations to the government. Like what kinds of policies and investments in the case of Brazil.

Priscila So maybe I should just remind that as of September 1st, Dow and DuPont have merged, so now we're called DowDuPont. And what is great about that is that it gives us a fantastic outlook into the future. And we defined as really our purpose going forward that our purpose is to reach the lives of those who produce, those who consume for generations to come.

So I think there are a few elements here that I think are very important, because when you make that commitment publicly, I think you are really committing to work not just from the production side and productivity side, not just, you know, the consumer side but looking at the whole value chain, all the way to the food production. And also when you have an element that's for generations to come, there is a significant component of sustainability. It's not for this season or two seasons or three seasons – it's for the long haul. So you need to do lots of things right to be able to earn that for the long haul. And that's the commitment, so just want to kind of put a parenthesis out there – that the two companies that have merged have had significant investment in research and in development and I'll use Brazil – Latin America in general – but I'll use Brazil and a bit more my experience coming from the legacy DuPont company.

So we've been in Brazil for 80 years in agriculture, playing a significant role in understanding agriculture at the customer or at the farmer, by farmer, large and small, what are the issues? What are the needs, current and future? And really our role is one of science, and it's one of innovation. It's one to really, as I said, bring ourselves or bring in partnership solutions that will make that difference in productivity, in how well we need to solve the sustainability issues as we bring new tools, as we bring new tools to solve new problems or improve livelihoods anywhere.

So DuPont has had, for example, over 10 research stations in Brazil alone, and that means that we have quite state of the art, I would say, in bringing technology and in driving technology locally. And we have a number of fantastic scientists, engineers and agronomists whose sole purpose every day is to solve local problems in agriculture. And I think sometimes we kind of bring a new solution, and I was just looking at the minister right here in front of me, Alysson Paolinelli, who we had the pleasure to be traveling together a few months ago. And we just were bringing a new tool for control of Asian soy rust in Brazil, which is a devastating disease.

And sometimes we talk about the performance of a fungicide and you kind of miss, you know, you don't grasp the totality of the impact that some of those tools have in a country that produces quite a lot of soybeans. But that, sometimes we don't feel the whole impact that a new tool would have to control a devastating disease like that. So during our trip I remember some of our colleagues, a minister, indicated that this is not a tool. This is something that goes beyond that. And if you look at a hundred billion dollars per year in the soybean value chain in Brazil, that's the value we're talking about, 7.5 million jobs impacted directly or indirectly by soybean production in Brazil, 2,000 cities. If soybeans didn't exist, they probably wouldn't have their livelihoods.

So sometimes we kind of think of our tools and we miss the big picture, and I think that's a great example of how technology can really be brought and have a role to play as we try to address all of those important issues.

Ginya So let's go from Brazil to Colombia, and I just want to ask Juan José. I mean, your farm I had the pleasure to visit about three weeks ago now. Based on the types of methods that you're using, you've been using for the past 25 years, one of the things that most impressed me is that the organic matter in the soil is actually, now in those crops, the sugar cane and the livestock, is actually denser than the surround native forest. So let's talk about what was the trigger or what was it? Was there some kind of public policy? Was there some kind of climatic event? What had you go, in this 200-year farm, to this, you know, changing to the type of farming that you do now?

Juan José Well, the main trigger was increasing basically productivity, about understanding our location in the tropical belt and understanding the origin of the soil. It was basically covered by trees. So what we tried to replicate is productive systems where we give the importance to the trees and allow us to increase the productivity by itself. So in particular terms, we have been able to take organic matter content in livestock productive systems from 2.9% to 4.1 in a lapse of 18 years, which is really fast in case of recovering soil properties.

Ginya You know, another thing that I found, you know, really impressed me about some of the ways that you have mixed that increase in productivity with that, you know, conservation element, is the quality of the crop that you're producing, the quality of the meat, dairy, the sugar cane. You want to say something about that?

Juan José Yeah. Basically, in the case of the milk and meat, we are an excellent quality. We have been able to increase fatty acids, and saturated fatty acids. And in the case of sugar, we are organically certified, and we have been providing the sugar to one of the main mills in the cacao valley and we have been like the pioneers in providing the sugar certified to the mill. So it has been an interesting thing for being differentiated in the market.

Ginya So, Ruben, you are neighbors with El Hatico.

Ruben No. This is a great progress and great examples, but I want to be a little more provocative here. Because, you may... those of you who don't know or work in Latin America, may think everything is fantastic, and it's not. And so to really get the transformation that we're talking about in rural agriculture and urban, there are

really only 20% of Latin Americans are in rural areas; 50% of the total population of Latin America lives in the rural/urban enterprise.

So we don't want to keep destroying the environment to increase production and be the bread basket for the world. I think one of the reasons why I am always an optimist is that I think this is a fertile ground for innovation, for investment. We need to do something different. Business as usual will not take us through the big challenge in the next 20 or 30 years. So I'm not criticizing, of course, my colleagues. My panelists say this is a great example, but at the scale, I still don't see it, so we need to do something different.

I give you just one example. So to come back to the sustainable food systems, we've been working forever on linking farmers to markets. You know, we should be working for a long time in linking markets to consumers, the whole value chain; because people in Latin America left the rural area a long time ago. So when you think of Latin America, I always, because it's easy to remember to divide in three, so you have the tropical, humid lowlands where the commodities from colonial times, you had the cacao, the banana, the sugar cane, all of that – that's one agriculture in Latin America. You had the local staples in the hillsides, the Andes, very different agriculture. And then you have the temperate plains, the temperate plains which is 70% of production of the entire Latin America.

So I think one way to really transform it is to start thinking on the heterogeneity. How do we tackle these huge differences? It's not one Latin America. The same... Since I have the microphone, one more. I'm getting going now. So one is... The other part of heterogeneity is that we keep talking about family farms – fantastic. I work at CIAT, this is a government mandate. But the national research centers, at the national research centers we don't only work for farmers – right? So we have to think on the entire sustainable food system. Of the 15 million family farms in Latin America, 10 million of those 15 million may not be viable in the next 20 or 30 years if you think that more than half of the income is already coming from rural non-farm. They have a farm, you see them. You can take a picture and put it in the annual report, but 70% of the time they're in the city doing something else. That's the 10 million of 15. The other four million are in an intermediate, that technology agricultural research, CIMMYT, INIFAP and many others can do fantastic. And then you have only one million totally integrated, totally integrated to grow. So it's very, very different.

So now just to finish, just to finish, we are only... The whole Latin America, the huge progress on investment is only one dollar on average for every hundred dollars produced in the sector. So the underinvestment in innovation is still huge. Thank you.

Ginya Let's go to Bram first, then we'll go to Victor.

Bram Yeah, I think to the challenge, I also think Latin America is also one of the areas where we have a big population of undernourished, hidden hunger; and at the same time we have a problem of overweight, of obesity – and we seem to jump from one to the other. And I think we need to learn from what has happened in Latin America and to bring that and look at other areas and avoid that same mistake.

Also, adding to what you said, Ruben, I think also having a lot of diversity – we actually have to give more value to that. Because if you look at resilience, if you have a lot of different elements, big farmers, small farmers, that may be a more resilient system if we value the right elements within that.

I saw a statistic a couple of days ago where the World Resources Institute, for example, is saying that 28% of population, active population in 2050 will be working in agriculture, so that's one out of four. When you look at it, you say – what are they going to be doing? Are they going to be farmers? Probably not. It's because we're probably are going to be asking other things from agriculture to provide to society, and we need different disciplines to be integrated in order to provide that, in order to harvest the brains of young people with new technology, with new elements that can bring big data to the farmers but also communication, etc.

And I think on investments, we always, obviously, coming from a research organization, say, well, let's invest more in research and innovation. So, yeah, let's do that, but I also think as research organizations, we have to be ready to turn that value into return on investment. So if we are going to use those investments, let's show return on investments socially, environmentally but also economically. And let's heartily show it to who those investors are. For example, if you look at USAID, we are in the U.S. here, USAID made a huge investment in wheat for the rest of the world. I'm very happy to see that every dollar invested by the U.S. Government actually had a spillover effect of \$20 to \$30 for U.S. farmers who use those same wheat varieties. So let's look at who our investors are, and let's bring more in to them by showing the value that is required.

Ginya Just before we turn to Victor, as soon as... We're going to take some questions from the audience, a couple questions. If you have questions and want to line up behind the microphone... Please, Victor.

Victor Yeah, I would like to elaborate more on about what Ruben just mentioned. In the organization that I represent we are very worried about the situation in the rural society. I mean, they may not be this high proportion of population, not necessarily being involved in the production activities, but they live in the rural area. So we are worried about that, and we certainly are concerned about the immigration. The young people and the heads of the family abandon the production activities in the rural areas. So we, in the institute we are trying to invest in human capital, particularly in providing the young people access to knowledge, access to education.

And in that respect, we have a modest contribution, that I expect, that I think is very important. We signed an agreement with the government of Mexico five years ago to provide the scholarships for young people that can study in the universities in Mexico, masters and doctorate degrees. So after five years, we have 1,280 students being in these programs and about 250, a little more than that, already finalized their post-graduate studies, and they are back in their own countries from Latin America/ Caribbean countries, and we are providing follow up. On there we are trying to incorporate into some local projects and programs in order to bring knowledge and also, to incentive the communities, to have the opportunity to bring this knowledge and eventually to improve the standard of living of the society. So that's more like what we are doing now.

Ginya So let's see. It's a little hard to see here. Is there someone with a question over here? Can you just state your name, please, and question briefly?

Q Hello. My name is Vivian Bernard. I am PhD student at Virginia Tech. My question is how to improve the technology transfer between Latin American countries different than Argentina, Brazil or Mexico. And do you have any specific strategy that is proposed? Thank you.

Ginya I'm sorry. It's a little bit hard to hear you.

Bram Knowledge exchange.

Ginya Knowledge exchange, okay, thank you. Let's take another question.

Q Hello, it is Isla Guarta . I am a PhD student in Ag extension education, Penn State. I'm originally from Mexico. I actually have two questions, but I don't know if I will have that time or not. One of them is like, as we are talking about how we see the potential of Latin America and the arable land that we have and all that, the potential for agriculture, there's also other eyes looking at the potential of industrialization and not in agriculture, but like in [inaudible] industries and all that. I think this is like another trap that like for agriculture, because there's a lot of loss of arable land for agriculture and conservation of that land. So I guess my question is like – how do you see like policy support for the conservation of arable land in Latin America? But I don't know if I have a chance for the other question.

Ginya Please find us afterwards, thank you. Okay, let's just take those two for now. Who wants to take the knowledge exchange question? Go ahead.

Bram I think that is an excellent question, where the exchange of knowledge not only within Latin America but also between different continents. I think it's absolutely important. And in order to do that, we probably should more look at the outcomes that we want to provoke than have a technology focus. So it's not about necessarily exchanging the technologies but understanding that if we want to provoke nature conservation while we increase productive, while we close the knowledge gap, how can we do that; and can we understand those processes that go on and then within that inject of knowledge.

And I think actually I want to highlight that knowledge is probably going to be ever and ever more important. I was talking to a high school this morning, and we were making the comparison that if you have a nice, beautiful car, the seed, and you drive that car on a gravel road, you will not get the potential out of it. If you put the seed without the right agronomy, it's not going to work. If you give the car to a six-year-old, he's probably going to, even on a nice road, going to crash it into the first obstacle that you find. So you need capabilities. You need seed agronomy systems, working systems around a farmer who knows. But even you know how to drive a car, you have the car, you have the paved road, and I give you earplugs and the dark glasses so you don't see, you're going to say that's unfair – I'm still going to crash the car. Today there's millions of smallholder farmers that are actually in that situation. They have a car, they have a paved road, they have capabilities, but we're giving them earplugs and dark glasses because we're not making that knowledge stream transparent. So I think that radical transparency to exchange that knowledge from a

free competitive space where public and private sector can collaborate, where international centers, their role in IICA has played an exemplary role in that, is to actually integrate the knowledge from the national system and actually the national systems to bring that knowledge into that international knowledge cloud, if you want to say it like that—I think that can really provoke a revolution.

Ginya Does anyone want to take the question, arable land, or did you want to build on that one?

Priscila I'm just going to build on what he said. I think it's absolutely critical. That's again, the knowledge transfer, bringing the technology is just a small part of it. Understanding the problem and how the technology applies to that specific problem, one farmer at a time. I think we've had some programs with USAID in Ethiopia that we now want to bring to some countries in Latin America, including Mexico, targeting 200,000 farmers, smallholder farmers. In a period of time, we see a huge difference, and it's not just giving them a hybrid seed; it's the agronomic, it's understanding what you do with it, and what are the other practices, including the business practice—what do you do with it, with your harvest? And I think what we've seen is, you make a difference, you know, how we again continue to have those partnerships and expand that knowledge—you know, whatever works here, let's try to see if we can expand elsewhere, and that's a little bit of the road we're on right now.

Ginya On the topic of arable land, I would just say those of you who aren't familiar, Brazil's Forest Code is the most ambitious of the codes. It really works to protect the forest while really supporting that increase in productivity. And how they do it is that, depending on where you live, there are distinctions in how much of your farm you actually have to set aside for conservation. TNC, the organization I work for, The Nature Conservancy, we actually have done numerous projects in Brazil to really support farmers complying with the Forest Code, because until they do comply, they are not eligible for exporting to various companies legally. And so it is a real impediment to their socioeconomic wellbeing. So this is one example of the arable land question I believe you posed there.

I'm going to take moderator's advantage here and add to that question for my esteemed panelists. And can we just talk for a minute about corruption, because one of the big problems that we have in Latin America is corruption and even when, if we look at the..., and in Brazil again, some of the beef and the exports and some of the impact that that's had. One of our big challenges that we really need to call out is—how do we deal with this corruption. Does anyone dare to take that question?

Ruben I want to talk about sustainable intensification.

Bram I think asking the question is already very brief, so thanks for that. And I think again it's about, let's look where data is missing, where there is knowledge obscurity. Probably there's inefficiencies, and somebody's taking advantage of those. So again I do think that some of the data systems and some of the elements that are recently being developed can help in that sense. So let's also there try to maybe generate some kind of a pool effect where we make those kind of elements transparent and, by making them transparent, make it, at least less easy to do the corruption. right? So

I think data and data streams but also making sure with those new technologies that we don't create, other inequalities where the access to the information is actually being restricted, where the big data... I mean, it's where you say – oh, now I opened it – because I gave to all the farmers a database of 36 million data points, and the farmers like, yeah, thank you very much for that. So I think those data points and having the tools to turn that into decision systems, that is going to be key. And I don't have the answer who should then generate and where should we position or deposit those decision support tools, but I think it's a huge thing for all here on the panel to think about, as we have a farmer, we have private sector, we have an international organization in the public policy to do that. Now, let's generate a pool that actually brings that corruption element forward by making it visible.

Priscila I want to add that, speaking of policies, I think one that we really need to continue to fight for in Latin America in general... Can speak for Brazil, but Latin America in general, it is really a regulatory frameworks that are science-based. And I think we're still not there, transparency and predictability. And I think those things will bring investment. The more we can drive anything databased, science-based, transparency, predictability, I think the more investment we're going to attract. And I think that's one area that we all need to be together and kind of fighting for.

Ginya Can we take one last question from the audience? Go ahead, please.

Q I forgot the question. I'd love to take the one on corruption. My name is José Zaglul. I'm from Costa Rica, and I hear you talking about technology and about innovation, but we haven't talked about education. And education, we know, is key for any country to develop. And what happens when we talk about the farmers, the kids of the farmers, if they want to go to a university, they're probably going to take an entrance exam that probably they cannot pass. And we all depend to go to university in an entrance exam that doesn't say much about their intelligence. And the ones that get the scholarships are the ones that score the highest. So most of the time we give the opportunity to those that have the resources and deny the opportunity to those that need it most. So I think that's a problem we have to solve and give them an opportunity.

The other thing is that...

Ginya I think we need to stop right there. Sorry, we're running out of time. So, Victor, would you like to answer the question on education?

A I would just finish.

Ginya Very briefly please.

A That also we have not... You know, the profession of agriculture is not well respected in our countries, and Victor sends people to the U.S. I wish we could send them back to our universities in Costa Rica or in Latin America.

Ginya Thank you.

Victor Yeah, I believe this education is certainly very important and perhaps since he brings the example of Costa Rica, which they have this university EARTH, and then we

have CATIE, which is a tropical research institute that offers master's degrees for tropical agriculture, so it's important. In our institute we are promoting the education, as I mentioned, through the scholarship program, but in order to train people for small courses, short courses in order to be able to access to the knowledge and learn and receive training in this specific area. So I agree this is a very important need to be more support. And in that respect, since you mentioned about corruption, I think this is an issue that we have to deal with, and this is an issue that starts with education. So in the farms at the rural level, we have to have people that act and behave in the proper, in the correct decision, learning from education. So that's what I would like to say.

Ginya So for those of you we weren't able to answer your questions, I apologize, but please do look for us afterwards. There are many of us here, and there is probably more of you out there who know a lot about this topic. I'm going to give the panelists and myself included just 30 seconds to do one last intervention, and I would like to ask you if there is one reason why people who don't work with Latin America, you know, don't even quite know exactly where Brazil is on the map, if there's one reason they should care about the Latin American region, what is it? Bram.

Bram I think Latin America has huge potential, so that's the answer. There's huge potential, there's huge potential for resilience, there's huge potential to build this dream of integrating natural resources and agriculture. If there's anywhere where those two communities are starting to come together, it's there, so I would just say just come for that, and if it's not for that, there's wonderful food.

Ginya Juan José.

Juan José Yeah, I would say that we have to promote, have the capacity to promote systems, biological systems, that can enhance recycling integrated systems that can promote more sustainable production. And I would say that we have the capacity to propose systems that are adopted and are capable of mitigating climate change conditions.

Ginya Victor.

Victor Human capital. I would like to stress that we need new generations that not just only understand agriculture but those who lead and love this activity. We need these new generations to understand and lead and make their life through agriculture.

Ginya Priscila.

Priscila Well, I would say, look at where we've come from – and with quite a lot of volatility, I would say, political volatility, economic – and look what we've done. And so I think potential absolutely is the future, but I think we have some important proof points that tell us we're doing something right.

Ginya Ruben.

Ruben I think it's fertile ground for innovation, and we have tried everything, the good and the bad and the ugly, for a hundred years – technical change, institutional change, reform, social safety nets, supermarkets, urbanization. So if you really want to have

lab on how things could be done in other places or help us improve, I think Latin America is the place to come.

I have just a great answer for a question that wasn't made, but perhaps we can discuss it in the break. But it's about sustainable intensification. You have to read the GAP report, the green, beautiful GAP report that was circulated this morning, is about sustainable intensification. But if you believe what I said half an hour ago on the typology of small farms, rural non-farms, perhaps the future is not only about sustainable intensification but to think about diversification. More than two thirds of the farmers in Latin America, the family farms, have already diversified. They're not going to intensify; only the large commercial farming intensify in some commodities.

Ginya And I have just one final comment. I want to leave you just with this thought, for some research that was done that was published earlier this year by the University of Ohio together with four Brazilian schools. And that research concluded that if low-carbon, climate-resilient practices were adopted in South America alone, by 2050, we would increase global food production by 10%, and we would reduce global GHG emissions from land use and land use change by 80%. That's South America alone. That's why you should care.

Thank you to our panelists. Thank you, Global Harvest Initiative, the Borlaug Dialogue.

Cynthia Milligan

Thank you all very much. A real advantage of coming to the World Food Prize is that we all learn, and so we appreciate your passion and your sharing with us.