2025 Norman E. Borlaug International Dialogue
Session Title: Laureate SOILutions: Cultivating Change, One Field at a Time
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Speakers

- Facilitator: Paul Schickler | Chair, World Food Prize Foundation Board of Directors and Owner, III Ag
- Mariangela Hungria | 2025 World Food Prize Laureate and Senior Researcher, Embrapa National Soybean Center
- Leonardus Vergütz | Chief Scientific Officer, OCP Nutricrops

Transcript
Paul Schickler:

We have an exciting panel here really focusing upon the theme of the Borlaug Dialogue. I'm excited to get started and so we'll do that. My name is Paul Schickler. I am chair of the World Food Prize Foundation. My business career was 42 years with Pioneer Hybrid International, then became DuPont Pioneer, now Corteva Agrisciences.

So a pleasure to be here. But most of my pleasure centers around the two individuals here. It's an honor to lead this panel. First of all, doctor Mariangela Hungria, I'm just going to repeat again because it's worth repeating, is the 2025, World Food Prize Laureate, for her extraordinary scientific advancements in biological nitrogen fixation. Those low cost technologies and the products that came from them have sustainably increased food crop productivity across tens of millions of hectares in Brazil, in South America and now is grabbing hold of hectares and opportunity throughout the world.

Leonardus Vergütz is Chief Scientific Officer of OCP NutriCrops, a global innovator in soil and plant health solutions. His mission is to empower farmers worldwide with science driven tools to improve soil health, enhance productivity and position agriculture as a frontline solution to climate change. Welcome to you both. This will be fun. So what I'm gonna do right off the bat is ask a question to the two of them, because I think it is relevant to both of their interests and their achievements over their lifetime.

This is especially true of me, having been in agriculture for 50 years now. If I look back, particularly two or three decades ago, biologics and synthetic fertilizers were often looked at as in competition and perhaps a threat one to the other. And so while many might perceive that there is a great competition between fertilizers and biologicals, can you each describe examples of how these two worlds, which many might look as competitors, can actually come together to improve soil health, yields and ultimately food security. Dr. Hungria, please, first.

Mariangela Hungria:

Oh, yes. As I'm much older than Leonardus, I have more stories to tell. So when I started in the I finished university, the master PhD in the 1980s, biologicals were completely enemies of synthetic fertilizers, okay, because it was you had to choose one or another one. And of course, there are fertilizers that inhibit the performance of the biologicals, but then mainly the industry of fertilizers, they saw us as well, if they succeed, then we'll sell less fertilizers. And this has been really, I had very difficult times, you know, including calling to the president of my institution saying, just shut up this girl, okay, because she's interfering with the progress of Brazil. But then, what were the two differences that we had? The first was that biologicals really, they were seen more for small farmers, for organic farmers.

And then when I had the opportunity to start my own lab at the EMBRAPA soybean center, I said, no, we have to do research for the biggest production, the biggest farmer and everything, because if it works for him, it will work for everybody. And then this allows us to get more and more room for the biologicals. And then finally, what happened now? We have biological nitrogen fixation, but then with this progress, we had another microbial process that finally showed that we can work together. We had microorganisms synthesizing phytohormones that then increased the root system, and then by increasing the root system, we proved, including with labeled fertilizers, that we can improve the efficient use of the fertilizers.

And then just now, the fertilizer industry really wants to improve their efficiency. They are putting lots of efforts like the nitrogen industry to have new formulations, new ways of applying, and phosphorus, Leonardus is going to tell. But then finally, we are working together. We saw that we can work together, and we are starting to work together, because I really, really believe that microbes can be the best ones to

improve the faeces use of the fertilizers, because of improving root growth, we will lose less of the fertilizer that we apply.

Paul Schickler:

Right. That's interesting. Of the panels that we had earlier this morning, I think it was Linda, she said that microbials can do one of three things. They can coexist, or they can compete, or they can collaborate. So it sounds like you're on the collaboration.

Mariangela Hungria:

Yes, yes.

Paul Schickler:

Dr. Vergütz.

Leonardus Vergütz:

Thank you very much, Paul. First of all, thank you for having me here. It's a great opportunity to be here among all these great minds on agriculture and food systems. Before I start, I'd just like to congratulate Dr. Hungria for this great achievement.

Again, as a Brazilian, this is not only the power of women, the power of, again, science, but the power of Brazilian science here, the power of EMBRAPA that you represent here in this big transformation of agriculture that we all need. And congratulations again. As a Brazilian, we are very proud to have you here and to be here with you. I think, again, picking up on the last part, which is the collaboration. Right?

I think this is today what we are really looking for is this big agriculture transformation. Today, agriculture is using almost half of all the land in the world. So today, agriculture is seen more as a part of the problem, but we truly believe that this is agriculture must become part of the solutions, not only for food security, but also for climate change. Not only we can do, but we believe we can do this. Right?

And today, it's really when we see soil health, which is understanding soils as a living organism, Today, we have to do is to nourish this living thing, which is not only with the microorganisms that we want to see, but also that we want to apply to the soils, but the ones that they already live in the soils. So then they can provide to us what we request, not only food security, but also all the other ecosystem services. We are requesting to the farmers that they can clean the air, clean the soil, restore carbon, improve biodiversity. How can we do this? And for us at OCP Nutricrops, we really embraced all these transformations.

We brought soil health to the core of our strategy. So today, the microorganisms, they are not our enemies. They are really our partners. It's through the microorganisms, through the living part of the soil that we can really transform agriculture. So today, how we see it's a big paradigm shift, even the way we recommend the fertilizers.

We are no longer just a fertilizer company. We are providing nutrients to support the health of all these invisible warriors that we have in the soil. So today, the way we recommend fertilizers, what we are working a lot at OCP, is really to recommend fertilizers for ecosystem services. Today, we are all here today, it's because we have been having access to nutrients. And these nutrients, they make not only us healthy, but also the microorganisms.

So again, today, we are feeding ecosystem services through the microorganisms. So it's a big paradigm shift in the industry and how we collaborate.

Paul Schickler:

And that's it? Go ahead.

Mariangela Hungria:

Completely, not just this increase in the aphasis. For example, people will think biological nitrogen fixation is just nitrogen, but like phosphorus, phosphorus is key for the performance of nitrogen fixation. For example, in Africa, in common beans in a project, we saw that if we applied 30 kilograms of phosphorus, then we had the nitrogen fixation, otherwise no. So we have to work together. I do not, we lost a lot of years not working together. So it's a new time now of collaboration.

Paul Schickler:

Right. And in fact, Leonardus and myself were talking earlier, and you just described this transformation of OCP from a mining company to adjusting to the future and taking advantage of the future and changing. That's a difficult adjustment to go through. Some businesses and industries that are changing migrate into obsolescence, but instead, OCP has looked at the industry, see how it's changing, and looked at it as an opportunity. And I applaud you for that.

You might describe a little bit more about how you looked at the changing landscape of agriculture as an opportunity rather than a threat.

Leonardus Vergütz:

Very good. Thank you for the question, Paul, and thank you for complimenting the answer about the need for phosphorus, especially for nitrogen fixation. But I think OCPs is a very interesting case, right? Today we call that we are in our third wave, and our third wave is based on science and technology. And we really believe that we can transform agriculture worldwide.

And that through agriculture, we can combine not only SDGs, the Sustainable Development Goals two and thirteen, which is climate action while ensuring food security, but also we can deliver peace and so on and all the other SDGs. So for us, this whole transformation, we really embraced it. We brought it to how can we do this? Because the other companies, usually we keep hitting our heads on how can we do this transformation. And it's really embracing and bringing this to our strategy.

Our strategy today is very simple. It's to deliver soil health worldwide. And why do we do this? It's because at the end, soils, they are the big interface of all the major spheres that we have. Biosphere, lithosphere, hydrosphere.

Soils are formed by all these big spheres, but at the end it controls them as well. It controls what we call the critical zone. So first at OCP we embraced, we brought it to our strategy, we are funding, we created a whole university in Morocco, which is again task to really generate, not only train the youth, but also generate the new technologies. We are having partnerships with EMBRAPA in Brazil and other big

institutions everywhere, so we can really deliver on the sustainability targets that we have. It's not just an ESG talk. It's really we embraced it. By 2040, my task is to really reach carbon neutrality and scope three everywhere in the world. So we have, I have fifteen years to do this. We need the collaboration, we need the microorganisms. So it's a big mindset shift.

Paul Schickler:

Very good, thank you. As I mentioned, 42 years with Pioneer, today Corteva Agrisciences, One of the things 100 years ago that Pioneer started and still practiced was developing innovation, but taking that innovation to the field so that farmers could see it, learn from it and then practice it themselves and then therefore benefit from that innovation. Can both of you describe an innovation that you've worked with farmers to understand what their needs are, demonstrated how to use it, and then the farmer has been successful as a result? So first with microbials, then with more of the broad category of nutrients, but first, microbials.

Mariangela Hungria:

Well, everything that we do there in Brazil, we do with the farmers, okay? Because they bring us what they want, the solutions that they want. And so in the case of soybean, we first went to them and we saw that biological nitrogen fixation with the soybean could improve. That was our first approach. Then we worked hard, we delivered a technical solution that it was that he could use every year fresh bacteria to improve nitrogen fixation to soybean.

Today is fulfilled only by biological solutions. And then this farmer was very happy, then he trusted us, then he came and started to ask things. So then he asked for solutions for the maize, then we found a combination of nitrogen fixation with phytohormones production. We launched the co-inoculation of the soybean, and increased the profits, but then we have to go every year there to really explain the advantage of biologicals. Now, look, biologicals are growing all over the world, and people really want biologicals.

Brazil, it has the leadership today, but even being the leader, considering the whole agriculture, just 15% a maximum is of biologicals, not only related to the nutrition, but also of biocontrol. We have solutions today for 50 to 60%, if their farmers adopt.

Okay? And then for 40%, we have to invest in science to get advanced. But can you imagine here in the US, I was talking to the farmers, maize farmers here, and the same situation as in Brazil, 35% of the costs of production is of fertilizer.

So we have to improve biological nutrients for these farmers to lower the costs, and to improve the faeces of the fertilizers that are so expensive. So that's why I say that we are in a position of a new micro green revolution, of working more with biologicals in this concept of one health, because having more biologicals will improve soil health, plant health, animal health, and human health.

Leonardus Vergütz:

Very good.

Paul Schickler:

Dr. Vergütz, how about your position, working with farmers to solve a problem that they see, and then making that solution successful in the marketplace?

Leonardus Vergütz:

Thank you, Paul, again. I think, again, once we talk about this mindset shift on how really to manage agriculture and recommend the fertilizers. So for us, it's really, it's a simple but powerful concept, which we call the four Rs, which is how to apply the nutrients, the fertilizers the right way, right? If any of us here, you go to the doctor, we have a zinc deficiency. The doctor is going to evaluate you and then he's going to give you the right recommendations.

So it's the right source of this nutrient, the right time for you to take, the right rate. And if you have to apply, you take, you put under your tongue or you take in your blood. So they're going to give you very good recommendations. Why don't we do this with fertilizer recommendations? So just the biologicals, they are a tremendous support, helping the collaboration.

But now to feed them correctly, I really need to understand how much nutrient do I need for food production, how much nutrients do I need for carbon sequestration, I need to feed the microorganisms in the soil. But the nutrients, they behave totally

different. If you take nitrogen and phosphorus, for example, so plants, not only do they behave differently in the environment, but plants need them at different times throughout the cycle. Why would I apply all of them together? So when I start to manage nutrients, nutrient by nutrient, following the four Rs, the right way of applying these nutrients, we can already not only feed the ecosystem service we wanna see from agriculture, but we can reduce drastically the amount of greenhouse gas emissions.

So applying the fertilizer the right way, managing nutrient by nutrient separately, it's one of the greatest advancements that we can have. And how to make it happen, it's really working with the farmers as Dr. Hungria is saying. So very often we try to develop things that we think the farmers need. No, how can we really talk to them?

They are the major actors of the transformation we wanna see. Now that our role as a science, as an industry private sector, how can we support them now in this transformation? And this is how we see it. So we need to be there talking to them, understanding them and bringing the right solutions.

Paul Schickler:

Listen and collaborate. Of course we're celebrating the opportunity and success of microbials and focusing on soil nutrition. But still, you just mentioned in Brazil, 15% utilization, you have the opportunity to move that to 50%. And clearly in the Northern Hemisphere, particularly North America, microbials are less advanced than in Brazil, and the focus on soil nutrition or products and management practices that would advance soil nutrition are behind. What do we need to do in what's focused upon The United States, to gain more acceptance and adoption of microbials, and then ultimately focus on soil nutrients as well?

Mariangela Hungria:

Well, our look at the soybean Brazil, you know that 85% of the whole area crop to soybean in Brazil, they use the biologicals for nitrogen fixation, and now also for root growth. It's incredible because but this was not one thing for three, four, five, ten years. It has been 40 years. We are 40 years investigating, doing extension, going to the farmer, explaining and everything. Look, if Brazilian soybean, 85% of the data can use this and be very successful, In the US, just a maximum of 15%.

So, but the soybean is the same soybean. The soil is there and everything, so they can't take advantage. Why they didn't? Because fertilizers were cheaper here, because breeders were not very interested, because of course, to respond to microorganisms, you have to have plants that were through a breeding process in the presence of microorganisms. So it's a completely different view and approach, and that takes years of research.

It's not just from night to day. So it's time, and I was with the maize growers here, our maize is adopting lots of biological solutions in Brazil, they were very interested, so it's the right time to start.

Paul Schickler:

Rights, so what can we do in The United States to drive a better focus upon soil nutrition, and what we can do to improve it?

Leonardus Vergütz:

I really think, again, collaboration is key, but I would say that it's a better engagement of all the stakeholders. And there's a great example coming from The US. If you take the WEF meetings in Davos 2024, when Anthony Blinken at that time, he went for one hour and he only talked about soils. It brought soils to the whole agenda. Here we're all converted right, so we don't need to convert people.

We understand the need for healthy soils, how this is at the core of our transformation. How can we make our stake stakeholders, our politicians understand that soil, it's more than dirt? So how do we bring healthy soils at the core of the agenda? How can we make them understand that by bringing healthy soils, not only to The US, but in every country of the world, we really, we're going to cut costs on people's health, we're going to improve their productivity, we're going to produce more food, we're going to sequester more carbon. So how can we make them understand that having healthy soils is at the core of the transformation that there's so much they are looking for?

So I think this is what it's the role of all of us. How can we speak up and really make them understand that and bring healthy soils to the core of the agenda of every country in the world?

Paul Schickler:

So let's just say, we are in that advanced state, where Brazil, we're realizing the opportunity, The United States has adopted improved practices. In a perfect world then, how do we take that success into smallholder farmers that can also benefit first?

Mariangela Hungria:

Well, the beauty about biologicals is that they work for every farmer, from small to big one and all farming systems. Okay? We have experience in Brazil because, you know, I think that everybody thinks about soybean farmers in Brazil, just the big ones, but 73% have less than 50 hectares. So we work very hard with these farmers, and they are very convinced about the benefits, they have profit. For example, in my state, working with 3,000 small farmers, they had a profit of $111 per hectare by using the biologicals.

This is a huge profit for them. It's the only cash crop that they have. So, they work for all farmers, so we have to spread this solution to all farmers.

Paul Schickler:

Right, right. Okay, so we've got one minute left. What can we do in Sub-Saharan Africa with OCP to drive acceptance to smallholder farmers?

Leonardus Vergütz:

We have a lot of programs there in Sub-Saharan Africa, in the whole continent. What I can say, it's really true, go back, understanding the farmers. You have to understand that especially the issues of the smallholder farmers, same conditions, same soil are not the same as the bigger farmers. Each one of them, they have different struggles. We need now our role as scientists, as extensionists, so we can understand what is the most limiting problem that they face.

So then they can, first of all, improve their productivity because it's very low. They have to increase their profits, just because they have more profit, they can really have a good living, they can afford to invest in the new technologies. So right now what we need to do, especially in this smallholder farmers, not only in Africa, but elsewhere in the world, we need to break this vicious cycle of poverty and land degradation that keeps retrofitting itself. Once we break it, we can really unleash the potential of these farming systems across the world.

Paul Schickler:

That's wonderful, that's what we wanna strive for. So very good, can you join me in thanking our speakers today, great discussion on the six that we've had, Thank you.