Center for Strategic and International Studies

TRANSCRIPT

Event

"How the Loss of Agricultural Biodiversity Threatens National Security"

DATE

Wednesday, June 11, 2025 at 4:00 p.m. ET

FEATURING

Gustavo Ferreira

Agricultural Officer, 353rd Civil Affairs Command, U.S. Army Reserves; Senior Agricultural Economist, U.S. Department of Agriculture

Stefan Schmitz

Executive Director, The Global Crop Biodiversity Trust

CSIS EXPERTS

Rod Schoonover

Senior Associate (Non-resident), Global Food and Water Security Program, CSIS

Caitlin Welsh

Director, Global Food and Water Security Program, CSIS

Zane Swanson

Deputy Director, Global Food and Water Security Program, CSIS

Transcript By
Superior Transcriptions LLC
www.superiortranscriptions.com

CSIS | CENTER FOR STRATEGIC & INTERNATIONAL STUDIES

Caitlin Welsh: Welcome. On behalf of the CSIS Global Food and Water Security Program and the Global Crop Diversity Trust, I am so pleased to welcome you to our public event "How the Loss of Agricultural Biodiversity Threatens National Security." I am Caitlin Welsh, director of the CSIS Global Food and Water Security Program.

I want to acknowledge at the outset of our program that associating agricultural, or agrobiodiversity, with national security is atypical generally – and especially today, when our concepts of security are evolving all the time. If you are skeptical about this connection, then I hope that our event today helps take you from what does agrobiodiversity have to do with security to agrobiodiversity has everything to do with security – with the economic security of individuals, food security of populations, ecological security of regions, and, yes, national security.

We hope that today's program will help bring these connections to life. We have a fantastic panel of national security experts, and we will also hear from the executive director of the Global Crop Diversity Trust, or the Crop Trust.

It's not only today's event, though, that will help draw the lines between agrobiodiversity and national security. Just a couple of hours ago we were so excited to launch a custom digital report, "The Nature of Strength: Creating a More Secure Future with Agricultural Biodiversity." This report showcases the best of CSIS scholarship and multimedia. And it brings these issues to life as, I think, only CSIS can. You can access our digital report at this QR code here. And we encourage you to read it, interact with it, and learn from it, and share it. In a few moments, Zane Swanson, deputy director of the CSIS Global Food and Water Security Program, will summarize some of the report's key findings.

Before I turn to Zane, though, just a few announcements. Following today's panel discussion we will welcome, and we very much encourage, questions from the audience. If you would like to ask a question, please submit it at the "ask questions here" button on the event page, or another QR code which we will show that you can scan if you're in the room to submit your question there. Following today's event, we will invite those of you who are joining us in person to stay for a reception on our second-floor foyer. And finally, the second-floor foyer is the location of one of our emergency exits, behind you and to the right. The other one is behind me and to the right. Should the need arise, which we do not expect, please follow our instructions and move toward the exits.

And with that, a very brief video.

(A video presentation is shown.)

Great. It is now my privilege to welcome to the stage my colleague and deputy director in the CSIS Global Food and Water Security Program, Zane Swanson. Zane was lead author of "The Nature of Strength." So enormous kudos to Zane and our colleagues in the iDeas Lab for this beautiful and compelling report. Zane, over to you.

Zane Swanson: Thanks, Caitlin. And good afternoon, everyone. Thanks very much for joining us for this event to discuss an underappreciated relationship, that between

agrobiodiversity and global security. As Caitlin mentioned, this event also marks the launch of our new digital report. I encourage you all to check it out after the event. You can find it in our program, but you can also find it by scanning this QR code, which Caitlin also mentioned. I'll keep my remarks pretty brief because we have a really important conversation ahead of us.

This past February we cohosted a side event at the Munich Security Conference in collaboration with the Crop Trust as well as our colleagues from the International Maize and Wheat Improvement Center, better known as CIMMYT. As the event unfolded and we heard from leading experts in the security community it became increasingly apparent that we had been operating with an incomplete picture of the global threat landscape. While there was consensus in the room on the importance of resilient agriculture and food security broadly, the connections to national security were less well understood and the threats posed by the loss of agrobiodiversity even more so.

Biodiversity is the foundation of our global food production system. This system not only feeds the world, but it directly and indirectly contributes the livelihoods of half the global population. Without agrobiodiversity, resistance to biological threats cannot be overcome. Without agrobiodiversity, resilience against environmental stresses cannot be endured. Already, losses to extreme weather, crop diseases, pests contribute to hundreds of billions of dollars in lost production each year. And all of these threats are getting worse.

In our report, we highlight just a few of the numerous cases where genes from diverse crops and wild plants are being used to bolster global agriculture, like the gene discovered in wild rice varieties in India that protects rice harvests from flooding in Southeast Asia and West Africa. Or, the ongoing efforts to protect the world's wheat production from ever-evolving fungal pathogens that could explode into a crop pandemic if left unchecked. Crop and plant species are silently lost every day. With them, they take the genes that have the potential to lead to improved crop varieties that increase yields for farmers and nutrition for consumers.

And it's really important to understand that we don't know what genes are being lost. It's to the benefit of the world that researchers, crop breeders, and farmers collect and protect these species in gene banks and on farms before they can be lost. It's imperative for our domestic security here in the U.S., but the security of the world that we understand the consequences of agrobiodiversity loss and appreciate them for what they are, potentially catastrophic. While we understand that the benefits of using agrobiodiversity are what they are, invaluable to the collective food, economic, and ecological security of our world.

You'll find more in our digital report, which was made in collaboration, as Caitlin mentioned, with our colleagues from the CSIS Dracopoulos iDeas Lab. A huge debt of gratitude to Sarah Grace, Shannon Yeung, Gina Kim, Jose Romero, and Madison Bruno, for their amazing work and their collegiality. It's now my pleasure to welcome Rod Schoonover, CEO and founder of the Ecological Futures Group and senior non-resident associate of the Global Food and Water Security Program here at CSIS, and Gustavo Ferreira, senior agricultural economist with USDA and civil

affairs agricultural officer with the U.S. Army Reserves. Welcome and thank you. (Applause.)

Ms. Welsh: Thank you so much, Zane. And congratulations, again, on "The Nature of Strength." And, Rod, welcome back. Gustavo, welcome for the first time. I really couldn't imagine a better panel of experts on national security to talk about agrobiodiversity.

So I'll start with you, Rod, first. We've had a lot of conversations leading into the production of this report, and also today's event. And, you know, one of the things that emerged in those conversation was that some people could challenge this notion that agrobiodiversity is hard security, or even is security at all. And you've been a really vocal proponent of this idea that it is security. So can you tell us about your conviction behind that?

Rod Schoonover: Well, first of all, thanks to everyone for coming out. It's great to be back here at CSIS. It's really hot outside.

So the connection between national security and food security is well established in the academic world. And whether you're talking about the difficulties of a nation in feeding itself, or food price shocks, just – we have – we could think about the 2008 food price riots. We could think about the Arab Spring. And so these are just examples of pretty well-established connections between food security. But there are other pieces to this as well. So, for one, homogeneous agriculture is systemic risk, right? It is a – just as in a complex system, it is a potential, and increasingly likely, right? I think sometimes we talk about this as "if" instead of "when," right? And so it is a point of failure in a complex system, right? It is a very simplified part of a complex system.

And so the potential for cascading failure is quite high. I would also call agrobiodiversity not just resilience, it's strategic resilience, right? It's purposeful, willing resilience. And lastly, I would say that, you know, the U.S., you know, all of these issues are – these global issues are also U.S. issues. And so the things, the idea that we can contain and separate domestic from international destabilizing forces is a fallacy. And so we – you know, we should think about things like agrobiodiversity in terms of stabilizing ourselves, right? It's not charity, right? It is selfish resilience for the United States.

Ms. Welsh: Thank you. Thank you. Another thing that emerged in our conversations is this idea that the defense and intelligence communities can prejudice threats that – to which actors are associated. So threats that have either people, or groups, or weapons, or what have you, associated with them. Where in reality, it's actor-less threats that pose risks that are just as great. So can you talk a little bit about this idea of actor-less threats, and then how we can do a better job of addressing them?

Mr. Schoonover: Right. And so the security community is sort of created around the idea of hostile actors, who we can point drones at or listen in on. And so instead of – you know, and I would say this is something really important in the 21st century, is that we need to move exclusively from who is trying to harm us to what factors are destabilizing or creating systemic risk, right, because harm is harm irrespective of

where it comes from. And I would say the 21st century is just full of emerging so-called "actor-less" threats. And so, you know, it's things like pandemics, things like biodiversity loss, crop pests, locust swarms. They short circuit the existing national security community because they don't know how to deal with them, because they're trained from a doctrine inherited from the Cold War, right?

And so we really need to think about, how should we adjust our national security doctrine – not just us in the United States; this is underway internationally – to match the threat landscape, right? Because when those are misaligned bad things happen, right? And you can only go so long until that leads to catastrophic failure. 9/11 here in the United States was one such instance. And so it behooves us to proactively lean into this kind of national security, rather than reactively. I would say we're overdue for a lean into thinking not as geopolitics as something that happens on a Risk board, where things – where the planet isn't moving, right? The planet is moving. The planet brings harm and threat because of anthropogenic forces.

Ms. Welsh: If we have time, I might turn that question back to you about how should we – how should we adjust in our security community to account for these threats. Not right now, but if there's time I might pose that back to you.

Last question for you. In our conversations you made a great point, which is that when it comes to biodiversity agricultural biodiversity is the closest biodiversity to humanity. And we're in a time where people are more and more often using this term polycrisis. So at a time when we're talking about polycrisis and ecological tipping points, how does safeguarding agrobiodiversity provide protection against future threats? You've touched on that a little bit, but anything else you want to add on that?

Mr. Schoonover: Well, I would say that – I mean, two parts of this. Agriculture is the part of the biosphere, that layer of living matter, that is closest to humanity – to our food, to our livestock, right? It is the one that we utilize and can provide, again, that strategic resilience in an almost certain set of cascading and compounding risks and threats as we go forward. And so one thing that – when you study polycrisis, and that doesn't just mean a lot of things happening. It means a lot of things happening, and they're connected. And vulnerability and threat, they're all intertwined together. They're very difficult to separate. And so one of the things that you learn when you really start to drill down on what it means to be in a polycrisis is to not get into one, to avoid it, because you're in a completely reactive mode. And that is almost certainly a recipe for bad outcomes, right? It's short circuits strategic foresight, strategic planning. So, yeah.

Ms. Welsh: (Laughs.) Thank you.

Mr. Schoonover: I'm good at parties. (Laughter.)

Ms. Welsh: Always great to have you here. If there's time, I might want to return to some of the concepts that you brought up. So, Rod, thank you so much. And, again, welcome back.

And very pleased, again, to welcome for the first time to our stage, Gustavo Ferreira. Gustavo is civil affairs cultural ag officer with the U.S. Army Reserves and senior economist with USDA. But I want to note that it's not on behalf of these organizations that Gustavo will be speaking today, but he'll be speaking from his general expertise including in academia in our conversation today. So, Gustavo, welcome.

Gustavo Ferreira: Thank you.

Ms. Welsh: For our first question I actually want to talk about how NATO prioritizes resilience of food systems and water systems, and how agrobiodiversity plays an important part in the resilience of ag systems.

Mr. Ferreira: Sure. Well, thank you, Caitlin, for inviting me to this event. Thank you, Zane. Pleasure to be here. And thank you to all the audience for being here today.

For those that are not familiar with this, NATO requires all member states to be resilient in seven baseline areas of civil society, from communication systems, to energy supplies, and to include food and water security. The USDA, my colleagues from USDA, do the assessment that is required about our own food systems, how resilient they are. In every country it's mandated to self-assess their resiliency in those specific areas. So, to your question then, how agrobiodiversity supports the resiliency of food systems, here's how I see it. You know, agrobiodiversity supports agricultural production, which supports rural economies, which supports food security. And those are pillars of national security. So that's the connection I see.

Now, I'm going to – I like to share examples, case studies, that kind of illustrate my point. I'm going to give a positive one and a negative one. So I'll started with a negative. Think about the Irish potato famine in 1845, right? A catastrophic event, triggered by one single crop failure, right? And it was not just that. It was much more complicated. It was bad policy enacted at the wrong time, right? Usually bad policies tend to erupt in the middle of the crisis, making things worse, right? And so, yeah, but the key factor here was, there's, you know, the entire potato production was based on one single variety, right? You know, the Irish lumper, I believe. Yep. And it was affected by blight. It spread really fast. And the results were, as we all know, 1 million people die, 1 to 2 million people were forced to migrate. So you had food security and economic security compromised at the national scale, because one single failure point.

The other one is a little bit more positive. Is what we see – anybody here from North Dakota? No? (Laughter.) So let me tell you something about North Dakota. So North Dakota, it's a(n) agriculture powerhouse in the U.S., right? And agriculture is a big part of the state's economy. And if you go back to 1990, 70 percent of all acres harvested were wheat. So high concentration of production in one single crop. Fast forward to 2024, 35 years later, that share of wheat shrank to 33 percent, now you got another third soybeans, about 20 percent is corn, and got 15 percent of a bunch of crops – from flax seed – they're the leading flax seed producer, canola, barley.

So they have successfully diversified their crop production, which protects them. That makes the state more resilient against yield losing events and against market

shocks. I mean, if the prices of wheat collapse overnight, now we talk about one-third of the acres impacted, versus 70 percent of the entire production crops. So those are two examples that kind of link how, you know, agrobiodiversity connects directly to food resiliency and national security.

Ms. Welsh: Thank you. I like the image that you presented, agriculture biodiversity is essential to agriculture, which is essential for livelihoods and food security, pillars of national security. Should have included that in our digital report. (Laughter.) In the course of our conversations that led into our report and also today's event, you were pretty emphatic about this idea that gene banks should be considered strategic assets. Can you tell us about that?

Mr. Ferreira: Yeah, sure. I think it's probably an understudied or underreported issue, right, that I think it's really important. And in the way I see is, a country that either own the gene banks or it's connected to the international network of gene banks, is better poised to deal with a crisis, especially if it's severe enough that it's going to cause countries to enact protectionist policies, and being less willing to share plant genetic materials and seeds, right? We see this, where it's spikes in prices, right, in commodity prices, what do countries do, a lot of times? They curb or they stop altogether exports of commodities to protect their own domestic consumers, right?

So, if a society, if a nation, has access to that capability in a time of crisis, they're going to be much better prepared to deal with that. And there's three arguments that, I think, support my thesis. First of all, think about the seed industry has become extremely concentrated, right? And that concentration has accelerated in the past 10-20 years with mergers and acquisitions. So now if you look at the landscape of the seed production, most of – the lion's share of the seed production is in the hands of a handful of multinational corporations. Which I'm not against that innovation and that concentration. But nevertheless, it poses some risks to nations that are not part of that landscape.

The other thing is, the People's Republic of China has made it really public, you know, in their policy communications, that they want to develop a strong domestic seed industry, right? And their rationale is they are not comfortable with their dependency on Western seed companies, right? That the imports of seeds from the Western multi corporations, because, again, it could compromise their food security in the event of a conflict or disruption – trade disruption. So the way I see is, if they think it's important, we should think the same way, right? It's just like saying, they think it is a national security issue, we should also think about it as a national security issue.

The third point is, it's not just – it's not just enough to create this gene banks. It's also important to think how you're going to protect them against both conventional and hybrid threats. Because that's one thing are often part of the discussions, where countries build stockpiles, strategic stockpiles of commodities, you know, to brace for some type of disruption. But then I ask, are you protecting those assets? Because from the security perspective, they're pretty soft targets, right? Think about grain silos and cold storage. Really large footprints. And I guarantee none of them have protection against aerial attacks from drones or a cyberattack, right? So you had to think about it. You create this gene bank as a strategic resource, but you

also have to think about how you're going to protect them in the worst case scenario.

Ms. Welsh: Thank you, Gustavo.

I have one more question for you, and then after that I'll turn to questions from the audience. And I see a couple questions we've received already, but I know we have some close collaborators and some new friends in the audience, so I really, really do encourage you to submit some questions so we can ask them to our panelists. But, Gustavo, last question for you before then is about something that you and Rod both alluded to. And it's about how – I'm forgetting the exact phrase you used, Rod – but some types of agriculture can actually be a problem, can actually be detrimental to agricultural biodiversity. Can you talk a little bit about how agriculture can be a solution and also a problem when it comes to this issue?

Mr. Ferreira: Sure. So the way – a lot of times this discussion is framed in this – in this causation. It's like, the loss of agrobiodiversity results in the loss – or, the erosion of food security, right? But the way, from my perspective, from my foxhole, I see, well, the pursuit of food security sometimes leads to the loss of agrobiodiversity, right? It happens, right? It happens. And I'm going to share, again, two case studies, a positive one and a negative – not a negative, but it's a reality, right?

So we all know, like, you know, the population – the growth of global population is putting pressure on food systems, right? And think it's between now and 2033 we're expecting several hundred million extra people to feed it, right? So it's eight years, right? It's a lot of mouths to feed in such a short – because people like to present this, oh, it's in 2050, right? No, it's, like, we're talking about less than a decade. So who – I mean, the People's Republic of China has been a leading consumer of food and agricultural products. Obviously, it's becoming a more – a much more affluent society. So have put a lot of pressure in the production of things like soybeans, animal protein, palm oil. And, you know, going forward the role of the PRC is going to decline, but you're going to see India and other Southeast Asian nations pick up that that role as major food consumers, because the increasing population is becoming wealthier.

So all that to say that, going back to the case of the People's Republic of China, as the biggest consumer of palm oil, right, or soybeans, it has implications – that has implications on those producing countries, right? So think about most of the – most of production of palm oil is concentrated in two nations, right? Indonesia and Malaysia, right? And I think it's about 98 percent of their – China's imports come from those two countries. That's put a lot of pressure on those ecosystems over there, right? Because, I mean, palm plantations are not the most diverse. It's a monoculture, right? And there's all this debates about, is this sustainable? The same thing with Brazil, right? So Brazil is now the largest soybean produced in the world, and also the top supply of soybeans to the People's Republic of China. Which is creating incentives for Brazilian farmers to expand soybean production area, right? It's a lucrative business. You know, each year they have another bumper crop. So it keeps going. So that's the example of pursue food security, you know, impacting agrobiodiversity.

On the positive side, think about what happened with the dust bowl in the United States, right? Another catastrophic event, right? But the U.S. actually was able – so that was – so the agriculture was part of the problem, right? If you know the details, the dust bowl was triggered by many things, but one of the things was low prices, commodity prices, high input costs, made farmers produce marginal – produce in marginal lands. They abandoned conservation practices because of reducing costs. So all that, compounded with four major drought events, create this catastrophic, you know, soil erosion event, right? Which created, like, an all-hands-on-deck response to it, led by the federal government, but all stakeholders were involved. And there's some policies that were enacted back in the 1930s, they're still in place today, right? You know, the conservation policies, the irrigation policies.

So in summary, I'll say there's three things that are required to solve this crisis. Number one, you got to have the market incentives. Can't go around them. It's, you know. But they have to be coupled with the right policies in place, that kind of goes hand in hand. They don't get in each other's way. And the last thing, you have to have the innovative, bold actions by the stakeholders. The farmers will figure out that – you know, the scientists will figure out how to solve some of these problems. So I think it's a combination of all those three parties to solve this crisis.

Ms. Welsh: Thank you for clarifying, too, that it's – as we talked about, it's in the pursuit of food security that that agrobiodiversity can be degraded. But thanks for those examples.

Want to turn to some questions from the audience, but, Rod, I want to see if there's anything you want to add to anything you want to add to Gustavo's comments, or do you want to wager an answer to the question that you had posed about how the national security community can adapt to these actor-less threats?

Mr. Schoonover: Well, what the national security community needs is a reboot of its doctrine. That's hard to do from the inside. It's one of those things. It's sort of like the National Security Act of 1947, which created the National Security Council, CIA, lot of things, had been bubbling through academia and think tanks. And that's where we are now. We need to kind of be thinking collectively what a national security community, what an executive branch, what a government looks like for the 21st century, right? And so it's not tweaking some knobs, right? It's taking a crisis moment, which we're in – it's not a future crisis, because crisis operates in decision-making space, right? The crisis is now because it takes a while to anticipate and get things in order. So we need to quit talking about crises as future. We're in it, right? And so how do we – how do we bring our governance, our security, in alignment with the world we're living in?

Ms. Welsh: How do we do that? And that's, in part, why we're here, and other colleagues at other research institutes as well.

Mr. Schoonover: These are big questions, right? But it is something that has to be multipronged.

Ms. Welsh: Yeah. Grappled with, yeah.

Questions from the audience. I want to turn first to Tom Ellison, who is in person, and then to Dave Bubeck. Let's take both questions at the same time, and then we'll ask Gustavo and Rod to respond. So Tom – I think Tom's right here.

Q: Stand up?

Ms. Welsh: Yeah.

Q: Hi. Tom Ellison from Center for Climate and Security.

I was just wondering if you could speak a little bit to, you know, thinking of the Nebraska example, right, a more diverse mix of crop production being more resilient. Can you talk a little bit about navigating the sort of political challenges or pitfalls of going about, in a policy sense, achieving that diversification, right? How do you avoid problems from vested interests or other kind of backlash you might encounter? Thanks.

Ms. Welsh: Thank you, Tom. And Dave – I don't know where Dave is in the audience – but great. OK, Dave in the back corner here

Mr. Schoonover: That's your question.

Ms. Welsh: Yeah, thank you

Mr. Schoonover: That's a rough one. (Laughs.)

Q: Now I have to remember my question. (Laughter.) No, so just in – specifically with China and the U.S., and you noted germplasm banks, do you think – how would you react to – should the two countries be protectionist of those germplasm resources? Or should they find some way to reach a free exchange, or some other terms of an exchange?

Ms. Welsh: Yeah. OK, great. Gustavo, do you want to?

Mr. Ferreira: All right, let's do it.

Ms. Welsh: And either or both questions, whichever you'd like to respond to.

Mr. Ferreira: I'll go in order of arrival. So regarding – I mean, the thing is, those diversification efforts oftentimes occur because of market factors, right? I mean, wheat prices were depressed for quite some time, and then markets emerged for, obviously, soybeans, right? Soybeans became one of our main cash crops for export markets. And then now we have this emerging – due to policy, right – emerging sector biodiesel, right, and biofuels, which is consuming a lot of this oil seeds, and obviously the ethanol mandate was a primary example.

So it's hard – those things go hand in hand, but sometimes one goes ahead of the other, right? Sometimes the market's going to shape policy, right, as a response to it. OK, so obviously this commodity is a winning course, so we're going to put our bets on it at the Capitol Hill. But sometimes it's just some of the commodities might be propped up by some policy decisions. And I don't want to get into specifics of the intricacy of policymaking, but, yeah, sometimes those changes happen organically

and spontaneously due to market, and sometimes you can see the heavy hand of some policy or regulations that shape the markets. So that's one.

To your question. Unfortunately, I think I don't – I'm not very optimistic about collaboration and exchange. And in particular, two things. First of all, a lot of this technology is in the – is in private companies' hands, right? So therefore, you know, that's it, right? It's proprietary. This is a really highly sensitive type of research. I mean, there's, you know, always cases of espionage and trying to steal some technology. But one thing you see from the Chinese perspective has been the purchase of really large agribusiness, right? And I'll give you example, Syngenta or Smithfield, right? Smithfield is here the largest pork producer in the U.S., Syngenta one of the top four seed producers in the world.

The way I look at it, it's those are strategic purchases. But they're not just to secure pork or to secure those seeds. It's to have access to the technology, right? Because as soon as, you know, those companies were purchased, the access to decades of trials and millions of dollars of research were, you know, accessible to the buyers, right? So it's a shortcut, so to speak. I mean, because that technology would take decades, you know, to develop in labs, right? So that's why I say I'm pretty pessimistic about potential – unless we hit some type of crisis that, you know, bound us together to solve that issue, I'm not very hopeful.

Ms. Welsh: Good. OK, thank you, Gustavo. I'll turn to Rod in a moment for comments on those questions. Just want to say too that Zane had mentioned that we co-hosted an event at Munich Security Conference with the Crop Trust and also with CIMMYT. And I see some colleagues here from CIMMYT. So I want to invite questions or comments from you. And, again, another invitation to the audience to submit questions. We'll have a few more after this. But with that, Rod.

Mr. Schoonover: No, just really quick. When you talk about alignment with doctrine with threat, right, the most important relationship geopolitically is the United States and China. In the greater context, right, is it better to have a strategic relationship with China, right, strategic containment, or an ideological one, right? Does your approach to China increase the risk going forward, especially in a world of intertwined vulnerabilities, risks, and threats? It's an open question. I have a very strong opinion of my own. I think that there are times when maybe, on certain topics, an elective Cold War is possibly not the best mode of action, right? Possibly a more strategic approach. So.

Ms. Welsh: OK. Thank you, Rod.

General question, but I think it's important when it comes to enacting a lot of the recommendations that have come up. This is actually – I see that the person who wanted to ask this question is in the room, so I'll turn to Hyunwoo – is that right? – from Sumitomo. Great. With a question about the private sector and what role they can play in, again, enacting some of the recommendations we put forward.

Q: Yes. Thank you so much.

I think you pretty much summed up my question very well. (Laughter.) But, yes, I mean, I was curious to hear what policy should be – what the what the government should do, obviously. You talked about North Dakota. Maybe this is dependent on state and federal, but a as a private corporation that not only invests in agricultural technology but also it trades agricultural products such as, you know, American pork, for example, or, you know, bananas in Southeast Asia, you know, we're curious to see what the private sector kind of should do. Should the private sector be following government directions? You know what – I guess with this increased – I mean, what you guys are arguing with, agricultural biodiversity relating more and more towards national security. You know, as traders, what does this mean? As investors, what does this mean? I'm just curious to get your opinion on that.

Ms. Welsh: Great. Thank you. Either you want to – (laughter) –

Mr. Ferreira: OK. That was a great question. So it depends. It depends who you're looking at how they're going to approach that, right? So obviously, in United States, you know, the government plays a role with, you know, land-grant institutions. We fund plenty of research. But the driving force of innovation in the ag, biotech, it's private, right? I mean, it's – and it's well funded by those companies, right? Because, again, it's really expensive research, right? Really, really expensive. And very lengthy. So you had to make – the return on investment, it's, like, 10-20 years on the road. But if you go to how the same issue is approached in China, and it's a much different view, right? It's the government and, I'll say, quasi-private sector, they're all intertwined, right? So you what you have is a much heavier role of the central government in funding and directing those type of research.

And, again, if you look at the public policy communications, they made it really explicitly that they're going to pour millions and millions of dollars into the sector to develop a domestic sector that makes them more resilient against, you know, disruptions of exchange of technology or goods. Now, there's things where I can see there might be reasons to cooperate across the board, between not just government, between corporation(s).

And the same – we were talking about it – is the issue of pests, you know, pest management. So we're kind of losing the battle against pests, right? Our pesticides are becoming less potent, less efficient, losing that race because they're adapting faster. So is that an area where we – we're both suffering from the same yield losses, right, due to the same pest across continents. So maybe that might be an area, because, again, it takes 10 years to develop that technology. And by the time you develop, the pest already evolved two or three times. And you try to kind of shoot a moving target.

So, again, it depends on the sector or the problem you're looking at, and depends on the nation that you're looking at. I know that's a lot, nuances, but it's – that's the way it is unfortunately. It's really – it's a complicated –

Ms. Welsh: Great.

Mr. Schoonover: So I spent 10 years in the intelligence community. And I would very often meet with industry who, you know, would make the very strong point: We have as much

interest in getting the security question right, because very oftentimes it's the bottom line that affects so many. I mean, there's a cascading effect within industry as well. One thing that was just mentioned, you know, we understand pretty well in this city, in this country, what the effects of a destabilizing climate looks like.

Why I think this is such an important topic, because we're talking about the biosphere. And what does it look like when the biosphere destabilizes? And you touched on it – pests. The infectious disease profile of every organism on earth is going up, right? That is a set of risks that almost no one is thinking about holistically, right? And so what does this mean? I would argue it means we need to take a deeper look and look at some of these things, like crop failures, as security failures, right? Because we are not protecting our strategic assets.

Ms. Welsh: Thank you. I will be very pleased to turn to Stefan Schmitz in a moment for some wrap-up remarks. But first, I actually want to combine two questions, one that we received online and one from someone who's here in the audience. The one that we received online is from Julie Howard. And she asked a question about the impacts of cuts and dismantling of USAID and USDA on agricultural diversity in the U.S. and globally. So the impacts of those cuts on actual agrobiodiversity, as it exists in the world. And then the final question, sorry, will be from Jamie Nickel, who's here in person. Jamie, can you ask your question? Great. Thank you. Also a U.S. government-type question.

Q: I'm pretty loud. I don't need a microphone. So I'm with FFAR. For those of you who don't know us, we build public-private partnerships to fund food and agricultural research.

And one of the things that I'm struck by in these conversations is how often research is left out of the equation as part of security. So I would be curious to hear you speak to that, and what you see as the role in maintaining security by making sure that we have a pipeline that, to the other questions, is not being disrupted. And what can we do to handle those disruptions in the long term?

Ms. Welsh: OK. Thank you very much, Jamie. So questions are about – from Julie, about cuts to budget and dismantling of those two departments and agencies. And then the second question about impacts of research funding cuts. So lightning round, I guess, for responses from both of you.

Mr. Schoonover: I will just say, U.S. national securities is impossible without the scientific enterprise. It is an illusion. And it's certainly not sustainable. So by cutting research into AG, climate, Earth systems, health, we are weakening our own – not just resilience, our security. And I think it's important to just say that as clearly as possible.

Ms. Welsh: Thank you for saying that so clearly. (Laughter.)

Gustavo.

Mr. Ferreira: No, I'm going to echo Rod's comments.

Ms. Welsh: Yeah. OK. OK. Thank you so much. Great discussion. It was such a pleasure to have both of you here to talk about a very difficult issue, but really to help bring these issues to light. So thank you, again, to Rod and Gustavo for joining us.

And it really is my distinct pleasure to welcome to our stage, I think for the first time, Stefan Schmitz, who's executive director of the Global Crop Diversity Trust. Stefan, over to you for a couple of wrap-up remarks.

Stefan Schmitz: Thank you very much, Caitlin, Zane, for your kind words, for you both, Rod and Gustavo, for stepping in here and leading this great – this great discussion. And in particular, also thank you for this great report – great report, this very valuable recommendations we need.

Why needed? We, the crop trust, Global Crop Diversity Trust, have the mandate to support the conservation and the use of genetic resources, plant genetic resources in gene banks all around the world, to make it available for research, for breeding, to be able to deal with all those challenges – pests, diseases are among the most important ones – of the future. These are ticking timebombs. And only a few people are really aware of the importance of those strategic assets, the crop diversity of, call it, plant genetic resources all around the world. Those resources are the treasure trove, the raw material for modern breeding to deal with all those problems. And hardly anybody is aware of, knows about it, and takes, you know, policy conclusions, recommendations out of this.

Usually we talk – I just came back – came from Manila and Penang. Had great conversations with agricultural experts. Really, they know about this. But beyond those closed circles of the expert, hardly anybody is aware. And with this cooperation we had here with CSIS, we wanted to break this. We are interested – and this is necessary, that the broader public, policymakers, broader public really is aware of this. It is in the interest of each and every country to conserve its own genetic resources, first and foremost. This is important. But beyond that, every – it is also in the interest of every country to make sure that those resources all around the world are conserved.

So there needs to be – there are no borders when it comes to, you know, conserving those resources. Gustavo, you make this one tragic example from Ireland, yeah? There are zillions of those tragedies around. This is the most important one, cause Ireland, at that time, only used this one potato variety. There were – still there are today enough potato varieties in the Andes, the center of origins of potatoes, which have the genetic traits, the resistance to that specific pathogen, to this specific thing. So if they had the access to those genetic resources at that time, they could have solved the problem. And those happens everywhere. We trust, and every and everything that happens, we need to conserve it.

And coming back finally to the great recommendations of this report, I just want to quote it to come to an end here. First recommendation, strategically protect and fund gene banks all around the world. Yes. This is really what is needed. Wonderful. Second, incorporate agriculture biodiversity into national security risk assessments and post-conflict stabilization strategies. Yes. That is important. We need to get out of this niche where we discuss this topic only with the ag ministers. Defense

ministers need to be aware of that, and others also. We need to lift this political profile. And third recommendation, encourage biodiversity on the farm and on the plate. That would help everybody for a better future of people and the planet.

Thanks again for the great work. Thanks for all of you coming. It was a great cooperation. And I think it should be – I hope for it is a start of something bigger, because we need a broader community of people who really fights for the conservation of agrobiodiversity, and the use of it. Thank you very much. (Applause.)

Ms. Welsh: Thank you. Thank you, Stefan, for your remarks. And thank you to your team for – you and your team for your excellent partnership. We really appreciate the work we've been able to do with you over the past year-plus.

Again, to Gustavo Ferreira and Rod Schoonover, thank you so much for joining us for our panel today, and your excellent insights – important insights. Zane, kudos on the report, and to our colleagues in the Dracopoulos iDeas Lab. Really, again, fantastic and compelling report that we hope that you will all read. To my whole team – Rose Parker, Joely Virzi, Emma Dodd, David Michel – and also, I think, the best in the business, our events production team – Qi Yu, Alex Brunner, and Dhanesh Mahtani – thank you so much for your work on today's event.

And to our audience, thank you so much for joining us in person and online. If you're in person, please stay with us for a reception outside on our second-floor foyer. This concludes our event. Thank you, everyone. (Applause.)

(END.)