Center for Strategic and International Studies

TRANSCRIPT

Event

AI for Food Security Forum

Plenary Panel III: AI & Food Security – The Geopolitical Moment

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FEATURING

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Helga Flores Trejo
Vice President, Special Envoy Multilateral Affairs and Sustainability, Bayer

Michele Quintaglie
Global Head of Communications, World Food Programme (WFP)

CSIS EXPERTS

Joe Glauber
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Caitlin Welsh: Thank you, Zane. And thank you Brian for demonstrating the way that TomorrowNow is using AI for weather forecasting and getting that information in the hands of smallholder farmers. As Brian said, he'd love to answer additional questions during the breaks.

It's now my distinct pleasure to introduce our third plenary panel, "AI and Food Security: The Geopolitical Moment." Over the past couple of months as we were full steam ahead planning for this forum our attention was diverted by the outbreak of the war in the Middle East. And instead of trying to separate these two issues, AI and food security on the one hand, Iran war on the other hand, Zane had the inspired idea for us to take this issue head on in this forum because, after all, the Iran war is the top issue of concern for many of us. And that's where the idea for this panel was born. In this panel discussion, we'll look at the ways that the Iran war and other recent global shocks like the Russia-Ukraine war and the COVID-19 pandemic have disrupted global agriculture markets and global food security. And we'll look at the ways that AI may enable us to better respond to these shocks.

We're delighted to have with us Vivian Salama, staff writer and national security reporter at The Atlantic. Many of you have read Vivian's March 18th article, "The Iran War's Next Threat is to Food and Water," which is an excellent overview of Iran war-related challenges to food and water security. Vivian brings to this conversation years of experience reporting from more than 85 countries, as well as a keen interest in global food security. So she's perfectly placed to moderate this discussion. Vivian, welcome.

Vivian Salama: Thank you so much.

Ms. Welsh: Panelists, welcome. It's a delight to have you. The floor is yours.

Ms. Salama: Thank you so much. It is always a pleasure to be here at CSIS. And obviously a very, very timely conversation that we're going to have. We have an all-star panel with me today. First, Joseph Glauber, senior research fellow for international food policy – at the International Food Policy Research Institute, and a senior advisor at CSIS Global Food and Water Security Program. Joining us from Rome, Michele Quintaglie – I hope I pronounced that right, Michele – a global head of communications for the World Food Programme. And Helga Flores Trejo, vice president and special envoy for multilateral affairs and sustainability at Bayer.

Now, I mean, just to set the stage here, obviously a very well read in crowd here, but we've had a cascading series of shocks in recent years. You had COVID, Ukraine war, now Iran, fertilizer prices going up,

shipping lanes shutting down, climate change being a greater and greater concern. And so we're hoping really to get to the heart of how we go from a state of maybe fragility to resilience here. And using tools like AI and other tools that, you know, these very qualified experts know more about than me can tell us about. So I'm going to start remotely with Michele – just to get us into the big picture here, Michele. How is the Iran war affecting global agriculture markets? How is it affecting food security in general today? And looking ahead, what risks do you see in the kind of short and medium term?

Michele Quintaglie: Yeah. Well, first of all, thank you for having me here as part of the panel. I'm sorry I can't be there with you, but I'm very glad to be able to participate.

Let me sort of step back and just say – start with a few comments. You know, first, I'm probably one of the biggest champions of AI in the World Food Programme. I'm a huge believer in it, because I can already see its impact across our entire organization. And, as I have no doubt that you've been discussing today and what you're sort of touching on in your intro, is that, you know, we're facing sort of an unprecedented level of hunger needs, with devastatingly low levels of funding, in a very erratic and precarious global environment. And the recent sort of – two months ago the start of the Middle East conflict, that really kind of brought it to light.

I think, you know, when I think about sort of the World Food Programme in general, probably the area that AI has played the biggest role related to the most recent – to this conflict is we are an incredibly large global supply chain sort of network. For those of you who may not be familiar with that side of WFP, you know, we work in over 80 countries. We're serving over 100 million people. We basically buy 50 different types of food from 10,000 different sort of sources and suppliers. And then we manage the shipping, the cargo, the aviation services, the trucking fleets, everything. All of that has to be moved.

Now you can imagine, much like you just sort of said, Vivian, we're living in a time and place where borders can close overnight. Kind of ports can suddenly become blocked and unusable for us. Where, you know, roads that you know previously we could use suddenly we have no access. And I think, you know, what we're seeing without question is the AI that we're starting to use within our supply chain capabilities is allowing us to help sort of recover very quickly. We can model out how to redirect all of these types of cargo and food sort of as quickly as we can, so that, a, we get to the people in need and, second, you know, we're not spending sort of enormous amounts of money. Because right now what is happening is, in this conflict, the inflationary impact on

moving anything, including humanitarian aid, is fairly high. So, you know, that factors into our ability as to how many people we can serve.

But I'll just give you one quick example, you know, sort of, like, to tell you just how complicated this becomes. You know, we, you know, sort of have 17 million people in a place like Afghanistan that need assistance right now. They need food assistance. And normally that food would be brought from Pakistan into Afghanistan. Well, a conflict exists now between those two countries. So then we were actually going to be shipping it through Iran. Then that conflict broke out. And then the food was moved to Dubai to sort of stay there for the moment, in our sort of warehouses so that we could sort of figure out how to move that around. And we very quickly needed to come up with a plan.

That food is now moving overland through seven different countries to be able to sort of get into Afghanistan, because the needs there are so severe. But that path to Afghanistan was actually generated through AI predictive modeling for us. So, you know, we're seeing the benefits of AI in real time. And we're really at the beginning of this whole process.

Ms. Salama: I do – that's fascinating. And I would love to revisit later in the conversation sort of the risks involved in a seven-country land transmission of food. But, Joseph, I want you to kind of give us a markets perspective here. You know, we're seeing renewed volatility tied to the energy markets and shipping risks. From your perspective, what is the primary, let's say, transmission mechanism, if you will? Is it fertilizer costs? Is it fuel prices? Is it trade disruptions? I mean, what is – what is really dictating how this goes?

Joe Glauber: Yeah, no, great question. And, again, thanks for the invitation to be here. Let me start with that.

Yeah, my job – I think you may have heard from some of my other, IFPRI colleagues on the program here – my job is a little different, in that I mainly track markets. And that's what I did. That's what I did when I was chief economist at the Department of Agriculture for many years. And that's what I did is my role as director of the Ag Market Information System.

Ms. Salama: President Trump also primarily tracks markets, by the way, just to put it out there. He's got his eyes – he's got his eyes on the markets as well.

Dr. Glauber: But late at night. Late at night. Late at night with a with a phone handy. That's a dangerous combination. Yeah, so, AI has become increasingly important. I think we were talking a little bit beforehand where, you know, when a crisis like this breaks out you have a lot of background

data that you can pull on and really sound really intelligent, because you can say, well, gee, did you know the Mideast accounts for this amount of fertilizer, this amount of liquefied natural gas? Boy, what do you know, India imports a lot of that. They also – sulfur is really important. And you can really sound intelligent. (Laughter.)

After that, it gets much more difficult. I mean, actually tracking what's going on – I think we're in kind of a – you know, it will be months, frankly, before we get trade data, published trade data from the U.N. system. We are seeing – you know, you can now track ships and, you know, maritime data, which is very helpful, to give you some notion. AI is used a lot for just sort of, again, in my case, just scraping data to try to get some notion of what prices look like in various places around the world. What Brazil maybe doing or not doing, in terms of fertilizer.

But to your broader question of how this, how this interacts with food prices, which I think is a real interesting case in the sense that this is a little different than what we saw in 2022. It's a little different than, certainly, what we saw in 2007-8, 2010-12 or so, when we saw those other big food price crises or food price spikes. We don't really see high agricultural prices right now. We have seen a little bit with vegetable oil. Vegetable oil is used as a feedstock for biodiesel. Biodiesel is a drop-in fuel, for the most part. So in some areas, we have seen an increased demand for that.

Ms. Salama: Not fertilizer?

Dr. Glauber: Not yet. And that's large – you do, on one hand. I don't want to say that this isn't having an impact on farmers. Farmers are facing much, much higher fertilizer costs, and are looking at projected cash profits at least negative in some cases. But a lot of farmers, at least in the northern hemisphere, purchased fertilizer before February 27th, and so were pricing it already in a very tight margin environment. So the issue is, well, how will that affect production? And will it affect production in such a way that we'll see increased food – increased agricultural commodity prices? And I say that to distinguish it from food prices, because food prices are very different. That is – when I talk about food prices, I really mean what consumers are paying for that.

And I think that actually will come probably quickly, only because of the energy component, or primarily because of the energy component, because energy is involved all the way through the value chain. You know, in the U.S. something like 85 percent – anywhere between 85 and – or 75 and 85 percent of the cost for food, post farm gate. So it's all the transformation and transportation and processing costs and other things. All of which energy plays a big, big role. But to the fertilizer

issue, then the question is – where I'm really looking right now is second half of the year. If we're still seeing real big problems with closure in the gulf, then you'll get the big production out of the southern hemisphere, which has not yet bought fertilizer.

Brazil, for example, buys most of its urea nitrogen fertilizer second half of the year, really in the last four months of the year, and first in January. And that's largely for a corn crop that comes in after they've harvested their first big crops. You know, so really that will be something to really watch. I think if you look at rice production, for example, India seems to have enough fertilizer for their main crop, rice crop. But their second crop, the rabi crop, that will be – they will be looking for fertilizer in the second half of the year. So I think that there's a little bit of time here. Producers react by either growing less fertilizer-intensive crops. So in the U.S. you would switch from corn to soybeans. We're seeing indications that already, from preliminary surveys, that farmers will be planting less corn, more soybeans.

But then the other thing is, do we see any drop-offs on fertilizer application rates? And I look back at 2022, and we had record high fertilizer prices, then also record high grain prices. So the profits were there. But we didn't see much drop-off in input use, a little bit, particularly for potash which was the main thing being blocked out of Black Sea at the time. But, you know, what will we see? And even though fertilizer use declined across all three major ingredients in 2022, global yields did not. And so that's the other thing, is –

Ms. Salama: So, generally speaking, I mean, granted, we're not yet two months in, most of the markets have remained somewhat stable? Is that an overstatement?

Dr. Glauber: Right now, commodity prices are – I mean, you've seen a little bit of action in the corn market, because people are going to plant les corn. And so I think we have seen some increases there. And I don't want to sound overly optimistic about this. I think the longer this goes on, the bigger and bigger problem this becomes. Because, unfortunately, in 2022 when we had all the problems in the wheat and corn markets, you know, wheat came out of the woodwork. There are countries that weren't large exporters at the time, all of a sudden were exporting wheat.

And a country like Egypt was able to – yeah, they had to pay much higher prices – but they were able to stay ahead and get the supplies they needed. Fertilizer is a little different because, particularly for potash and phosphates, that really depends of whether or not you have

those minerals. Nitrogen, a little more, but we also have the problem with countries with export restrictions. And I'll stop there.

Ms. Salama: We'll take as much of an optimistic picture as we can get at any stage. And, you know, certainly with the situation being what it is.

Helga, we had a beautiful setup on the humanitarian and the economic situation. You come at this from the private-sector perspective. I know from my conversations with White House officials, and certainly government officials around the world, that they are really looking to the private sector for solutions here, to be able to figure out ways to proceed, to get food where it needs to go, to have access to the supply chain logistics that they need. And so can you tell me, just from Bayer's global operations, how the Iran war is impacting supply chain logistics, agricultural production?

Helga Flores Trejo: Mmm hmm. Thanks so much, Vivian. And maybe, if I can start just with a reflection, because I do think that, put it in context, as we see it is important to analyze, as you call it, for the panel, that geopolitical moment. And I would say really three major forces are at play that will both really shape the next century and reframe our economy and the global order that we have seen. And one of those forces is the political. That's the geopolitical fragmentation we are seeing. The second is the planetary, with the limits in natural resources and, of course, climate change. And the third is the technological, with the opportunity and both the risk and opportunity of AI, either exacerbating inequalities or being the most, you know, strong tool for development yet.

And in a way, the Hormuz Strait crisis is reinforcing a trend we have seen before, that geopolitical shocks are not one moment in time things anymore, but we have to think of them as systemic risks for production, et cetera. Now, food security sits exactly in the intersection of this planetary, geopolitical, and technological opportunity that we see. And so the conversation here is indeed very appropriate. When you ask me, what is it? For a company like Bayer right now, the direct operational impact for us is relative small. As a company directly we don't have much going in and out from the region. But whether that direct operational impact is small is really not the question, because for me it's rather that systemic impact. And we will be all impacted.

And here maybe I –

Ms. Salama: It's no longer about regional operations anymore. It's global.

Ms. Flores Trejo: Exactly. And here's where the connection to the global and more the systemic and not one-time shock. One is fertilizers. And you were

talking about that, right? If one-fourth of the fertilizers, the global trader of fertilizers, goes through there and we don't have it, you have two problems.

One is affordability, so price increase, and the other one is access. Some farmers will just not get it. It's not being productive. You don't have it. So that's the first one. Second is the fuel. Of course, we have seen this price increase in lack of access, and in some countries already restricting. The third one is freight, right? The cost of transportation. Again, it's bringing a time delay. It's bringing a price question and how many can access it, it's another one. Farm margins was the other one. For farmers thinking right now about all these input costs, is the question for them, do I plant or not? Rising prices means maybe the decision not to plant, and lower yields, so not to put in.

So at the end, definitely for me what we thought of the beginning of the Hormuz Strait as being a chokepoint for energy, is also a chokepoint for food security. And we have to see it that way, as the cascading implications come in. And hopefully not, but I am afraid that probably already many of the impacts are there, even if the war stops tomorrow. And that means a slow-motion crisis for people. And the World Food Programme has some numbers of how many more millions of people we expect to suffer hunger already.

And so my takeaway is we are in front of a systemic challenge, independently of just how quickly the process ends. And we need for us, for food security, it means that in the future you need to think about chokepoints as leverage, as one of the question – bringing security to the whole business, to the whole market. The fragmentation of energy markets as the second one. And volatility is here to stay. And that means, again, if you have volatility of prices, OK, well, then farmers will think about it, how much they would plant.

Ms. Salama: I haven't heard you talk about freight costs.

Ms. Flores Trejo: Yes, freight. I mentioned.

Ms. Salama: Oh, yeah. So, like, so, I mean, tell us more about element of it too. The insurance costs, the freight – the fear that these freight companies have to take the risk anywhere in the region right now, but certainly then globally they feel the pressure from the cost of the of insurance and everything like that. How does that impact the operational realities? Just to get a little more -

Ms. Flores Trejo: Yeah, I mean, in general it can be for us, as – you know, as a seed company, for example, a lot of the seeds are produced locally, right? So

it's less – it's more the inputs that would need to be. And as a pharmaceutical company, there might be some inputs. But in general the farmers are the ones being more impacted, and therefore, indirectly, we – all of us.

Ms. Salama: So you think that if the war were to settle down possibly, you know, any kind of shipping cost, insurance, and sort of the expenses of just moving these products around the world will kind of settle down. And even from an economic perspective, Joseph, you know, how does – how do those operational realities –you know, the technical side of things, of moving food around, moving energy, moving oil – how does that kind of play into the bigger picture?

Dr. Glauber: Yeah. I think the higher energy costs will continue in the form of higher shipping costs.

Ms. Salama: Yeah.

Dr. Glauber: Yeah. I might add, we're still way below what we were in 2022 on shipping costs. So, I mean, thankfully ships had come down –

Ms. Salama: Because of the Ukraine war.

Dr. Glauber: Yes, that's right.

Ms. Salama: Right.

Dr. Glauber: So one needs to put all this in perspective, to a degree. And the insurance problems are really in the gulf.

Ms. Salama: Do you think the 2022 experience has kind of given a greater risk tolerance? Is that why they haven't gone as high?

Dr. Glauber: No, I think the –

Ms. Salama: I mean, the Middle East tends to freak people out, for lack of a better way of explaining it.

Dr. Glauber: Well, remember that all these prices were higher in 2020 than they are now.

Ms. Salama: Right. Right.

Dr. Glauber: Right? Energy prices –

Ms. Salama: Because it was already COVID and everything like that.

Dr. Glauber: I mean, because – that's right. It largely was – the acceleration began in, like, June 21, with the recovery from COVID. But, yes. And then it all started falling through the second half of 2022. Unclear here, because of the continued closure.

Ms. Salama: Right, right. OK, so we still – we are still not – again, back to your optimistic take on things, we're still – it could be worse.

Dr. Glauber: I mean, it's all – you know, talk to me in two months. I mean, it really is – right now you think, OK, things look good, or don't look good but the on the commodity price side we haven't seen the food spikes. And I think the other issue – and I'll be brief, but – is we haven't seen the big demand pushes that we saw in 2022, that we had huge demand out of China because of recovery from African swine fever and other things that they were – and the huge push in demand out of COVID, which really did accelerate a lot of the demand side of things. Global stocks had all come down. Global stocks are at pretty good levels right now for most of the major commodities. And that's a nice buffer, you know, that can absorb at least some problems if they were to emerge.

Ms. Salama: Right. So, coming back to you, Michele, just in terms of these market realities, the market signals, and the humanitarian impact. I mean, how long typically do you see a lag, if at all? What are the early signs? And is there anything that can be done when you see those early signs to avert real catastrophe, especially for these countries that are enormously dependent on imports?

Ms. Quintaglie: Well, it's hard for us to kind of look back at 2022 and make a fair comparison. Because, you know, our budgets are year to year. And so, you know, already the cost of freight for us has gone up, I mean, by and large, 20 percent. So we didn't budget for this conflict. And we were already, you know, sort of like at dangerously low levels of funding. And I will say that in several countries, and we work in more than 80 countries, we are seeing kind of the price of food go up. In some cases it's 20 percent or more. So, you know, the impact is real.

And everything that my fellow panelists are saying is very true in terms of the worries, in terms of the future agricultural output. I mean, we're going to see a lag. Even if the war were to end today – and all the people I speak to across the World Food Programme who have been through the Ukraines, the COVIDs, all of these major kind of chokepoints previously – they have said to me, Michele, we are months away from sort of seeing, kind of, like, the impact start to dissipate. You know, this is – this is going to hurt, you know, sort of long term.

So, you know, definitely, we're concerned, I think that on a positive note, you know, look, if we we've become so much more sophisticated, and with the help of AI, in understanding how to access these markets, how to access supplies, how to get assistance in. So thankfully, we've got that working for us. And where we can on the ground, we're diverting and we're getting it in. But you're talking tens of millions of people that need help. And it's not just they need help for a short span of time. They need help to not just sort of be able to manage the inflationary impact of what's happening, but to be able to recover and to eventually become self-sustaining.

I guess, the last thing I've mentioned too is, you know, we're living in an age where conflict is just everywhere. So, you know, you can redirect supply chains and there can be another issue tomorrow. And this is a little bit different from the period of Ukraine. We've never seen this level and this expansiveness of conflict across so many countries. And that makes it also equally challenging.

Ms. Salama: And, Michele, just to follow up on that, you know, we just heard Joseph explain, and you just mentioned again, COVID and Ukraine war. Although Joseph says the situation now is, let's call it, less bad than it was during the Ukraine war – the start of the Ukraine war. Is there a greater fragility now? In other words, did have these countries never fully rebounded back to sort of pre-COVID levels that now any shock brings them – you know, makes it accelerate – the humanitarian crisis accelerate faster than it might have pre-2020?

Ms. Quintaglie: Yes. I think you you've raised a really good point. I don't know if it's attributable to, kind of, you know, what happened back then. I think it's actually attributable to what I just referenced. You know, sort of every person I speak to basically sort of says, as you have no doubt covered yourself, you know, the major driver of hunger today starts with conflict. And the level of conflict is far greater than it was even three, four years ago. So, you know, that is what kind of creates, as you know, people moving, you know, sort of deciding they need to migrate.

You know, sort of it just completely means that they don't have any coping mechanisms anymore. And now the ability to sustain themselves, as you're indicating, their fragility level, is much, much higher. So, you know, I just think we're facing a very different set of circumstances. We've learned a lot through the prior crises, but we know that, you know, sort of it doesn't take a lot for people to sort of extend over the edge into more extreme forms of hunger, when they are already grappling with very low levels of nutrition to start with.

Ms. Salama: Right. So we really want to get into the AI element of this and finding solutions. Helga, you know, you from Bayer's perspective, but even broadly based on your expertise, how are we addressing, now that we've seen sort of this cascading effect in these series of crises in recent years, using tools like AI to be able to address these crises, to mitigate, you know, having much more severe impacts than what we've seen?

Ms. Flores Trejo: Yeah, indeed. If we then assume that the world will remain both volatile, and fragmented, and everything that we said before, then the task at hand is – with technology help and driven by technology – is to reduce risk and to become more effective, something that also Michele was thinking about. Now, if I look at fertilizer, we mentioned already the invasion of Ukraine shows already one of those chokepoints with fertilizer, and the tremendous impact, long-range impact, it had for countries well away from Ukraine. And this, Hormuz Strait, shows us again that fertilizer is a key product and that we need – we need changes if we are going to be more resilient in the future.

And one of the things, indeed, where AI has proven tremendous – the combination of AI and the biological advances that we have had in the last ten years, this biotech, because we, Bayer, are probably one of the few companies with partners that are working exactly on changing that dependency from – moving that dependency from synthetic fertilizer to finding solutions that are more biological. Or to finding solutions that crops that are helped through microbes and other interventions, thanks to AI and data, to be much more efficient on the way they extract nitrogen from the air.

And here, I don't want to get too technical, but just to give us a number, right? Four billion people depend currently on fertilizer for their food.

Ms. Salama: Four billion?

Ms. Flores Trejo: For their food. So we need something. Plants need nitrogen in order to grow. And we need that solution. So imagine if you really reduce, going from synthetic solutions to biological, that will not completely change the market but it'll introduce options that are completely necessary. And in general – we had a presentation by also CGIAR before – the degree in which we can advance in breeding new crops that are more resistant to also the climate change questions that I addressed at the beginning, that has improved tremendously. Just to give you an example, we at Bayer, we manage 25 billion data points of phenotypes of seeds. Now, thanks to AI and data, you can manage and work with those to work for breeding, and breeding exactly the plants that will grow in a future world in a way that you reduce going from years of

breeding procedures to months. In general, reducing just how you generate new options and improve. So it's tremendous, the upside that the technology can bring for food.

Ms. Salama: I will come to you, Joseph, in a minute to talk sort of about the enthusiasm around AI in this area. But, Michele, you know, you in your intro you did talk about AI finding solutions, say, for Afghanistan, to get food into Afghanistan where – you know, when you couldn't do it another way. You know, in a split screen perspective, if you were to kind of put the Ukraine war, you know, against the current crisis that we're seeing in Iran, from the humanitarian perspective, what would be an AI solution? What did we learn from the Ukraine war that we might be able to implement or to use as solutions for AI-driven solutions for the Iran war? And maybe what lessons too that were not learned or that failed in the first – in that first conflict that might maybe be useful now.

Ms. Quintaglie: Yeah. I think probably one of the things that is working even better now than probably existed back then is – I think the U.N. is, you know, and humanitarian agencies in general, are – you know, there's more of what we call a common services approach. So, you know, you can't deal with the scope and size of these crises individually as agencies. You need to be working not just across other U.N. entities, but with all the other large humanitarian NGOs. And sort of saying, OK, if we get the space, if we have the common warehouses, if we have the infrastructure to be able to move things, if we set up the telecommunications, we can sort of support each other. So I think, you know, what we're seeing clearly, even just now with the Middle East, is things can change very quickly. And one agency's ability to respond, one government's ability to respond, one, you know, sort of, you know, community NGO's ability to respond, very limiting.

So I think you're seeing a much more concentrated effort among the humanitarian world, in particular, to say, look, I can't go it alone. Let's actually sort of pre-position things so that we can respond more quickly, more agile. That's also where AI comes in, because it basically sort of tells you, from an agility perspective, here's where you want to actually have your supply depots. Here's the corridors you're going to want to be able to use as alternative routes. And then you share kind of that intellectual property, that capability, that support amongst agencies. I think that has improved tremendously.

Ms. Salama: Interesting. So just to tell us in terms of the measurable differences that AI is making in this area, in terms of food systems, you know, evaluating – detecting and evaluating gaps – you know, explain to us, you know, how it is really making a meaningful impact.

Dr. Glauber: Yeah. And I'll build on something that Michele was talking about in terms of information sharing. That's another area where I think the U.N. agencies and a lot of the international organizations, like my own, spend a lot of time during the week, conversing with one another and exchanging information. On the AI side, I think, both combined with other existing technologies that have been improving, things like Earth observation – and I know someone from NASA Harvest will be on later. I've worked a lot with NASA Harvest and GeoLab, which is sort of a consortium of Earth observation scientists who do crop monitoring around the world. All that material, all that information, has, I think, really improved a lot.

I mean, I've been working with Earth observation data for a long, long time. And I can say, particularly when I was at the U.S. Department of Agriculture years ago, we used it as an indicator. And we might say, well, this looks like the satellite imagery is showing some dryness in this particular part of the of the world. We may send out staff from the embassies out to look at those things, to ground truth it. But we're now getting much, much better, I think, with AI and other things to get a real time assessments, you know, to scrape all sorts of data sources to try to come to improve that information. Again, trying to get more timely and more accurate information is sort of the Holy Grail. And, I think, you know all that comes at a cost. So you want to make – you know, and there's a danger of getting it wrong. So it's also important to sort of – a lot of verification, and things like that.

Ms. Salama: Definitely. And let me be devil's advocate for a minute. Definitely during the Ukraine war, and in past conflicts too, we saw governments that would impose export restrictions and things like that. You know, AI can only do so much in trying to find solutions, but if governments are not willing to work together to try to alleviate crisis, it doesn't alleviate the crisis. (Laughs.) You know?

Dr. Glauber: Oh, yeah. No, no. Absolutely. And I think the geopolitical side of this is critical. And, in fact, it was sort of the rationale for the creation of the so-called AMIS group back in 2011, is that – thought, well, OK, yes, there are other entities, like International Grains Council, FAO, USDA, who do monthly estimates on global crop productions. But can we get them all together to come out with a document that that, you know, involves all these other countries, and that we can get some sense of a shared sense of here's what the information is for the this point in time? And I think that's been useful. It's been, if nothing else, a useful forum for a lot of those countries to get together.

And the other big part of that was monitoring policies. So export – we talked a lot about export restrictions. The other side of it are subsidies,

you know, to subsidize the purchase of these commodities. So, I mean, it's very understandable. Everyone's paying high prices for fertilizer. But if you're going to say, OK, well, we're going to make everyone whole, don't worry, spend whatever you want, the markets prices are trying to tell you to use less and instead, you know, richer countries and everyone else is not – you know, they're going to buy and use whatever. And unfortunately, that means the poorer countries are paying even higher prices as a result. So these things, these policies, really can have adverse effects on overall markets.

And so I think that these fora, like AMIS or, you know, FAO, or other places, are – you know, are really important to try to at least let everyone know what the market situation is and whatever, so they don't make bad policy decisions.

Ms. Salama: I do want to bring the audience into the conversation momentarily, both in the room and virtual, but just a really quick question for all of you. Can you point to one example, either a country or a program, that have been genuinely improving resilience? Either right now or in recent years? Have you seen a real success story that you can point to and say, like, these guys got it figured out? I stumped you all? (Laughter.) I mean, maybe their silence is –

Dr. Glauber: Look, I'm actually a big believer that the markets have done a pretty good job.

Ms. Salama: Yeah, collectively?

Dr. Glauber: I mean, I think 2022, you would have thought that was a really bad, bad situation. And we were writing on that situation in the first part of 2022 saying, you know, this is – I forget – almost 35 percent of the world wheat market. How's Egypt – the countries that are – you know, import – and they found wheat around the world. And, again, fertilizer is different, because you have a handful of countries that produce potash. Or you have a handful that produce phosphate fertilizers.

And we see these chokepoints that have this impact. But I'm just saying that I think that, you know, outfits like the World Food Programme, if they have money to be able to operate, they will find ways to get grain through seven countries, to Afghanistan. And I think – so I think the system – you know, the markets have worked pretty well. I think, again, unfortunately, we're being hit by crisis after crisis that has nothing to do with how the markets work, but everything to how geopolitical actions have impacts.

Ms. Salama: Right. And since you brought it up again, Michele, I'm just going to ask you, transporting food and aid through seven countries. How does that work without, you know – how do you mitigate the risks involved in that?

Ms. Quintaglie: Yeah. You know, I mean, I will just say, honestly, this is – and I truly mean this – this is where the World Food Programme truly excels. I mean, it just – it's been doing this for 60-plus years. And it has – it just is very, very good at managing supply chains.

Going back to your question about resilience, you know, resilience is one of these words where it's sort of a little bit of how you define it. I would say there have been a lot of pockets of success with resilience. The problem is you, you get in there preventatively, you actually help keep communities who are going through a period of extreme food insecurity not to not to move, not to uproot themselves. You get them through the shock of that moment. They are able to recover, and, you know, sort of, like, get on with their lives.

And that's resilience, as far as we're concerned. But the challenge is people – you know, we're not able to always easily, you know, quantify, you know, what – because it's what didn't happen. You actually prevented people from actually sort of becoming even more disrupted in their life and even more vulnerable. So I think one of the challenges we face is being able to tell that impact story of what resilience is, because a lot of the work, truthfully, is very preventative, and then therefore you're kind of assuming this is what could have happened.

Ms. Salama: Helga.

Ms. Flores Trejo: I mean, just briefly, what you saw with invasion of Ukraine is just a tremendous dependency of imports in Africa. And the last calculation we had is that last year Africa paid more in import food than even in their debt. So a hundred billions a year in Africa, extraordinary. But what you saw already since then is many African countries saying, well, we need to produce in Africa. And why not? We have the land, we have the young people, we have the resources. So you've seen – you've seen both more openness to new technologies and production sites. And Zambia has been one incredible example. They've been hit with the worst drought in 40 years, and nevertheless came back producing more.

We are investing in Zambia, for example, for seeds that are produced there, for the region. Again, reducing the dependence and getting access to high technology, technology that farmers in Brazil have. Why shouldn't the farmers in Africa have it? And they proved that even

through crisis, like shocks like the invasion, or crisis, like the drought they have experienced, that coming out of that and producing, again, very strongly. So I think that combination – and what I have learned, and maybe we'll talk about these during the question and answer – is that the question is, how do you give access?

Ms. Salama: Access.

Ms. Flores Trejo: Exactly.

Ms. Salama: It was – literally, you read my mind.

Ms. Flores Trejo: How do you manage the access? And I think we all have learned that the need to work, both as companies with the World Bank, for example, or with World Food Programme and others, to deliver on these technologies. And one of the things that we recently – it was not us partnering, but convening the partnership between CIMMYT from CGIAR and UC Davis exactly to bring these new technologies, going from synthetic fertilizer to biological solutions, to Africa. The idea is to bring then wheat that – wheat solutions to Africa so that not only few can benefit, but others. And we were happy to be conveners of such partnership.

And that, I think, doing more of that, is what's needed. The World Bank is working on that, and we connect. And maybe the last thing, I think, since the last crisis, since Ukraine, unfortunately, it put food on top of the political agenda globally, I believe. And so trying to do those partnerships to deliver on that is, I think, what we've been doing since then. And obviously we need to accelerate.

Ms. Salama: Yeah. Fascinating. I want to let the audience jump into the conversation. If you raise your hands, there are folks with microphones. And also our friends online as well, we open the conversation to you as well. Gentleman right here. Don't forget to introduce yourself, please. Yeah.

Audience member: Hi. My name is Abhishek and I'm an attorney.

I have a two-part question. So Helga mentioned that 4 billion people are currently dependent on kind of fertilizers, right? So how much of the incoming shock can be absorbed based on a move to organic or the biological solutions you mentioned? And how much of the shock can be absorbed by, like, substituting for the animal feed that is grown and – instead of growing human feed instead of animal feed? Thank you.

Ms. Salama: So that was a question, I think, for you.

Ms. Flores Trejo: Yeah, I mean, right now I don't think we have immediately a substitute for synthetic fertilizers. We don't. I think in the mid and long term we will have. We have this innovation. We've been testing. Others have. I think we will have that. But for now you need it. Now, in terms of other type of substitutes, I think for food you need all of the above, right? Everything. But here, Joe, can speak –

Ms. Salama: Joseph and Michele are nodding as well. So –

Mr. Glauber: Yeah, no, I think in the short run, the answer is very little. I mean, what can be adjusted is you can, again, grow less maize and grow more soybeans, because you don't need as much fertilizer. And that makes economic sense from the these points. But I don't think – and with high feed costs, you will get a natural destruction of the demand for livestock because they have to feed – but that – again, that takes a long, long time. And, quite the converse, it takes a long time to build back up, as we've seen here in the U.S. with record high beef prices but very little increases in the actual herds. So it's not easy. These are aircraft carriers. And you have to try to turn them around, you know, very, very slowly.

Ms. Salama: Very slowly, yeah. Michele, did you have any thoughts on that, or are you –

Ms. Quintaglie I'm good.

Ms. Salama: OK. We'll go to the next question. I saw a hand over here. Don't forget to introduce yourself. Sorry. And we'll come to you next.

Audience member: Hello. My name is Abnuaf Chittori and I'm with MIT.

One question I had was ever since the invasion of Ukraine we've been seeing a phenomenon where Russia is essentially stealing Ukrainian grain and then selling it on the market. I was wondering to what degree that this revenue stream for Russia could become even more lucrative as food security continues to erode due to the Iran war, other factors.

Ms. Salama: Do you want to take that one Joseph?

Dr. Glauber: Yeah, sure. I think insofar as food security is concerned, not much unfortunately. I mean, fortunately, I guess. I shouldn't say unfortunately. That grain is making it to the market, OK? And it's bad for Ukraine. And it's interesting, because of the discussion on AI, what is being done, NASA Harvest, among others have been doing a very good job of trying to monitor occupied territories, see what – trying to estimate what production is being produced on occupied territories, to get some

notion of where that grain is. There's a whole range of analytical groups and others who monitor ship movements in the Black Sea. Unfortunately, as you're probably well aware, you know, ships turn off transponders and they go dark, and there's all that whole thing. But a lot of that gets tracked, in one sense or another.

I think, again, the good news is – and I would say this in 2022 in particular – one of the reasons why we didn't see the big problems that we were – that many of us were so fearful of is that Russia had a huge crop, in and apart from, you know, occupied territories. They had a huge wheat crop. And a lot of that wheat made it to – because they needed money, and the wheat wasn't sanctioned – a lot of that made it to the global marketplace and really brought down wheat prices. And then that, plus the U.N. initiative that opened up the Black Sea for Ukraine. Hopefully, that's another thing that would be a very useful thing to see right now with the current situation, is to get some sort of brokered deal where we would at least allow fertilizer products through the strait. I think, unfortunately, I'm less sanguine about that than what we saw in the Black Sea in 2022.

Ms. Salama: Thank you for that question. We have one online question. We're going to take that really quickly, and then we'll come to –

Ms. Welsh: Yeah, thank you Vivian. And thank you to our panel. We do have a question from the online audience that I think follows quite nicely.

Which is, in recent shocks, we've seen countries adopt more protectionist policy stances to mitigate against the domestic risks of these shocks. What are the risks of AI reinforcing these protectionist policy tendencies by enabling strategic hoarding, or even market manipulation?

Ms. Salama: Any of you want to jump in on that one, the risks involved in particularly market manipulation?

Dr. Glauber: Yeah, I think there's certainly a risk. And, unfortunately, these sorts of policies – and we refer to them as beggar-thy-neighbor policies – where they, you know, are intended to help your domestic population, but, you know, by trying to keep prices low, either for commodities that you may want to typically would export or other sorts of – or insulating producers by, as I say, by subsidizing purchases of those inputs. But what that does is, you know, export all that volatility onto the rest of the world. So, you know, to the degree that AI can augment it, I don't know so much about that. I think there is a whole – information is power. I mean, there's no question about that. And I think to the degree

that information is made available and is public, that helps prevent those sorts of things.

And I think, if nothing else, you know, the WTO is very much in the business of trying to track policies implemented by countries, trade policies, that affect border measures and other sorts of things, things like export restrictions. I know IFPRI, we've maintained – or have been maintaining an export restriction tracker. And all that's important information that people can look at and see. And that there are fora like the WTO where those questions do get asked of those members that are implementing those things. And I think that's where, I think, you know, the flip side of it. I don't know if I can speak so much about AI creating the problem, other than the information flow or. You know, and certainly there are ways of distorting information. And that's very much a concern.

Ms. Flores Trejo: But I think – I would turn it around, right? In this complex situation, when you have to view how will climate or El Nino will impact, how the blockade is impacting, how export registrations will do it, I think modeling through AI helps us try to better understand just the complexity of political, environmental, logistical challenges. So I would see it as a tool to better – to better navigate and increase the resilience.

Ms. Salama: I mean, Joseph also made me think of sort of a follow up to that, which is, how do you deal with governments that distort their information? There are governments that are not transparent with some of the information that we're talking about. And AI may not have that ability to kind of think critically about, you know, adding a bit of padding or kind of factoring that into its assessment. And so I'm curious if any of you have kind of confronted that as well, or it's a real problem.

Dr. Glauber: Yeah. I think the easiest thing to point to – and, again, I'm anxious to hear what the others have to say as well. But, you know, you think back in 2022. Russia stopped reporting trade data to the U.N. And that was – you know, yeah, it may have lagged a couple of months, but you had a pretty good indication of where that grain was going, or whatever. That all of a sudden became a very big issue, trying to track – to see, well, what – you know, where are we? You know, these countries that are so dependent on the Black Sea, where are they getting their grain? You know, not all country – and Russia is one of many countries that don't report grain. They happen to be a big exporter, so that's where it becomes a big concern. But on the importing side it's very difficult, particularly in Africa, to – you know, it's a handful, 10 countries or so, that that that report on a periodic basis.

So you then go to other means. And so, you know, WTO, in conjunction with the International Grains Council, set up a portal where you could look at wheat exports. And there, they were capturing, again, any maritime wheat shipments. Now that doesn't count what's moving overland, unfortunately. But still, a lot goes out through the Black Sea and other ports. And so they were capturing that. And so that that helps you put some piece of – you know, it's that the old adage of being in the room – dark room with an elephant, or whatever. You really are grappling and feeling a lot of different parts trying to figure out what that beast is. And I think that that is where AI can help, I think, because we do get information, other information, that you may not normally be monitoring. You know, you can – good machine learning will help pick up on that.

Ms. Salama: Right. Right. Michele, please by jump in if you want. You know, sometimes it's harder when you're remoted.

Ms. Quintaglie: Yeah. No, don't worry. I mean, you know, your question, I would say, we deal with this, you know, sort of on a regular basis.

Ms. Salama: I'll bet, yeah.

Ms. Quintaglie: Because we're putting out reports all the time about the state of hunger. And all of these things are contributory factors. Now, just a few weeks ago we launched in New York, you know, thanks to the help of Google.org and probably other people who are in the room with you today, what is the most comprehensive real time view of hunger and the state of food security in the world. And it's called hunger map live. And anybody in the room can go on it and see it. And what makes that interesting is because it has all of these layers of information, from, you know, climate to market surveys to agricultural outputs to conflict, to all the things. And then there's an AI machine learning capability that actually does actual sort of food security predictions for us, allowing us to sort of plan.

But to get back to your point, there are certain countries that would not be part of the hunger map because, again, they want to be somewhat protectionist about their information, for whatever reason they don't feel that it accurately reflects their situation. And again, that's important information for everybody to sort of see and share. And increasingly we hope that becomes less an issue. But yes, you're absolutely right. You know, sort of, like, there is, you know, sort of a hesitancy from some parts of the world and some countries to be sort of open and transparent about that.

Ms. Salama: And the new tools obviously don't necessarily help in that matter. Yes, we had a question over here.

Audience member: Thanks. Dina Esposito, formerly with AID, currently with Women20 on the Ag and Food Security Advisory Group.

I have a question. I want to come back to the food security potential knock-on effects of what's happening in the Middle East. I know that global food stocks are relatively stable. We're not seeing spikes yet in food prices. But we also know that energy prices are high. And that sooner or later that's going to hit the consumer. And I just feel like we may be – we're very eager to distinguish it from Russia's invasion of Ukraine and the food crisis that kind of emerged there, but I feel like we might be – what are the modeling tell us? If we look at the eventual impact of energy prices on food prices, the overlay of El Nino in certain parts of the world, currency depreciations in food-insecure countries.

Are there certain, like, no regrets anticipatory action that people should be thinking about now, so that when the food shocks hit or we find ourselves in a sudden situation we haven't said, gee, we should have done something sooner? What are your reflections? And I know for WFP already, if they're spending money to go through seven countries with transportation, that means they're serving millions of fewer people. So you're already having a food security knock-on effect there. Just a few more reflections on whether we need to be sharper on the food security impacts of the energy part of this crisis. Thanks.

Dr. Glauber: Yeah, let me start. And I would agree wholeheartedly. I kind of glossed over that bit at the very beginning, but as I – at the very beginning I made the point that, for me, that's the big concern right now, is energy. And I think that that will – you know, what we – certainly what we saw here in the U.S., you know, coming out of COVID, it took a while. Now, it wasn't just energy. It was wages and other sorts of things that really got built into a lot of higher food prices or a higher inflation. But we know that this is already hitting, you know, inflation here in the U.S. And I think it will start hitting food inflation later this year. It typically takes a few months for those costs to get built into retail food prices. But, yeah, I think that's a real concern.

It's also a big concern if you're sitting in a town, you know, in Africa, far away from a port. All of a sudden all those – the prices of moving food to that town has gotten a lot more expensive. And I think – in particular I think from it makes Michele's job all the more difficult in a – you know, coming on the – coming on the tail of – well, a crisis every year. I mean, quite literally. And I think the conflict portion of this, I think, can't be emphasized enough, that that is really driving hunger around

the world. But this just makes it so much more expensive to address those needs.

So I'm not sure you can do much about whether or not El Nino ends up really reducing a global rice crop, which it could. And that certainly would send prices up. El Nino didn't have that effect in 2023, but the correlation is pretty strong with negative – or, drier weather in the southeast – or Southeast Asia. So we'll have to see with that. But I think for the contingency markets, or contingency providers like WFP, that's where it's really important. And I think trying to make that case, unfortunately, is a fulltime job.

Ms. Salama: Yeah. Michele, we have about 30 seconds left, but I see you're nodding. So I just want to give you the final word here.

Ms. Quintaglie: Yeah. No, I think, Dina, it's an excellent question. You know, sort of, like, we're already starting to sort of alert and warn people that, you know, sort of, like, Horn of Africa, in particular, is going to need anticipatory action. It gets back to kind of the ability, the bandwidth for people to absorb, kind of, like, the future impact, when we're living in the current crisis. And just, you know, I think, without question, if we can get people aware, you know, sort of and taking action and helping to fund some things, then we have a really good shot of actually sort of minimizing what could be a much larger impact from this crisis. So you're absolutely right.

Ms. Salama: That's a great note to end on. Thank you so much to csis and to our great panelists for talking to us. We really appreciate the questions, everyone. Thank you. (applause.)

Ms. Flores Trejo: Thanks so much. Thank you.

Ms. Welsh: And thank you, Vivian, Helga, Joe, Michele. Thank you so much. Everybody is welcome to continue the conversation over coffee. And we will reconvene here at 3:15.

(END.)