

**WORKSHOP:**

**FOOD SYSTEMS DASHBOARD DEMONSTRATION**

*Workshop Leaders: Lawrence Haddad and Jessica Fanzo*

October 14, 2020 - 11:00 AM - 12:30 PM

*Introduction*

**Barbara Stinson**

President - World Food Prize Foundation

---

Welcome to one of our featured International Borlaug Dialogue workshops. We're offering a new interactive concept with these workshops focusing on the tools needed for achieving safe, affordable, nutritious and sustainable food systems. This year's workshops offer an opportunity to better understand and engage with the policies, statistical and scientific tools that will translate concepts into action.

In this upcoming workshop you'll hear about some of the most creative uses of the Food Systems Dashboard to generate solutions for food systems transformation. The Food Systems Dashboard revolutionizes decision-making by compiling and providing access to country-level data for 150 indicators that measure the components, drivers and outcomes of food systems. It was an immense pleasure to work with Dr. Lawrence Haddad and Dr. Jessica Fanzo to prepare this workshop session for all of you. We hope you find the Food Systems Dashboard to be as fascinating as we have. Start thinking about how your expertise can be paired with this resource to make our food systems more resilient.

**Lawrence Haddad**

Executive Director, GAIN

---

Welcome, everybody. My name's Lawrence Haddad, and I'm the Executive Director of the Global Alliance for Improved Nutrition. And I'm just delighted to welcome you to this session on the Food Systems Dashboard. This is an idea that Jessica Fanzo and I had about five years ago when we were working on the Global Nutrition Report. And we were so deeply frustrated at having to scabble around for data to describe food systems. And even for us as coming from our research background, we were really struggling to do this. And we thought, well, if we with our research background – we're used to looking for data and putting it together and making sense of it – if we're struggling, what on earth must government policymakers, business leaders and civil society leaders be having to go through to find the data. And if you can't find the data and you can't organize it and you cannot describe your food system, you can't even figure out where it's not working and where it's working well, much less what to do about it.

And so two years ago or three years ago we were generously supported by a couple of funders with some seed funding. And Jess Fanzo and a team at Hopkins just took this idea and ran with

it. And two years later we have this incredible platform that we are still working on. You'll hear from Jess. Jess will describe the platform to you. I'll help describe it as well a little bit, and you'll hear from two of the technicians who are really working on this day to day. They'll tell you some of the features of the Dashboard they think are really exciting and very cool. And then we'll move into a session where four of our competition winners, the top four competition winners, will share how they are using the Dashboard to illuminate problems and come up with solutions.

So we have a really exciting session for you. I'd like to thank the World Food Prize for making this time available to us. And I'd like to thank Jess and her team at Hopkins for really leading this charge. Jess, over to you.

### **Jessica Fanzo**

Bloomberg Distinguished Professor, Johns Hopkins University

---

Thank you so much, Lawrence, and thanks to the World Food Prize for giving us the opportunity to present this work and the Dashboard. Lawrence isn't giving himself or GAIN enough credit here. They have been with us since Day 1 when Lawrence asked us to join in this endeavor, and so it's been two years in the making and a real labor of love, and we're really happy to present it today.

So the way it's going to work, we'll present a bit of the Dashboard. We're going to ask some of our core team members to present some of the features that they really like of the Dashboard, and then welcome our winners of the contest. So I'm going to share my screen.

Okay, so the Food Systems Dashboard – what is it and what is it good for? So why did we need a Food Systems Dashboard? Now, Lawrence talked about that a bit. But we know that there's increased international attention on food systems and how they shape diets, nutrition and health status of populations, climate, environments, as well as livelihoods of many that work in and outside the food systems. But policymakers are often in the dark on how to manage their food systems, and they need to understand better where and how to start to fix some of the challenges that they face.

So we thought there was a need for tools that can contextualize food systems – describes them, tells them where they're off track, and provides insight into the linkages of how food systems are impacting these different outcomes like diets, nutrition and the environment. And when you try to find food systems data, as Lawrence had elaborated, they're found across many different databases, sometimes databases that are very difficult to navigate. You need to be quite an expert on understanding data and how to use it. And it's hard to find at times, and it's not really pulled together in a cohesive way.

So we set out to establish a more user-friendly Food Systems Dashboard that includes many different indicators across food systems to better shape food policy. And the goal of the Dashboard is really three different entities.

So the first is to describe, which is what the Dashboard currently does, to help improve stakeholders' understanding of what their national food systems overall look like, what they are characterized by. The second two features of the Dashboard that we're working on now is the Diagnose feature as well as the Decide feature. The Diagnose will enable stakeholders to determine what challenges exist in their food systems towards different outcomes. Are they on

or off track? What could they be doing better on? What could be some policy interventions? And the Decide is suggesting some of those policy interventions and priority areas of action to improve some of the challenges that policymakers face with their food systems. And this work we're developing in collaboration with Professor Corinna Hawkes at City University in London and her team.

So if you go to [foodsystmsdashboard.org](https://foodsystmsdashboard.org), you'll see this is the homepage; and we won't elaborate too much on all the features, but we wanted to just give you a quick tour of how you could use the Dashboard. Now, who would go to use this? Well, we are hoping that policymakers in countries, policymakers working at the regional and global level, use it as well as their national fiscal agency, offices, and policy analysts working in government ministries. But we know that the Dashboard is also incredibly useful for the U.N. and NGOs, and other development practitioners, civil society, business leaders, as well as research academics and students.

This is our organizing framework of how we mapped different indicators across the food systems to the Dashboard. So you'll see that we have many indicators of food supply chains – that's food being produced, moved, packaged, processed, and it hits markets. We have a slew of indicators on the food environment. This is markets, restaurants, canteens, the places where you as a consumer engage with the food system and you make choices about what to purchase or buy. These food environments have many different indicators and triggers for how you make decisions. We then have individual and consumer behavior factors – those are consumers. Consumers are part of the food system; they engage with it every day, multiple times a day. And of course then we have outcomes – diets, nutrition, health, environment and economics.

Along the top are these drivers exogenous to the food system but shaping food systems in positive and negative ways. So we've tried to map indicators across all of those elements in the framework that was adapted from the High Level Panel of Experts Food System Report. Now, the indicators we have are representative of most countries in the world. There's a lot of food system indicators out there, but we've focused on those that are representative for most countries.

And we've also tried to make it visually easy to understand, appealing, easy to print out. So here's just a snapshot of some of the prettier visuals that you see when you delve into looking at the Dashboard. So here's the link, so those of you who want to explore it while watching the webinar, you can do so.

And over the next few months we're going to continue to add more data with a push to about 250 indicators in January of 2021. And we're going to be doing some country pilots, testing the Dashboard in several countries in Africa and Asia. And we will also be looking into the idea of collecting sub-national data. So stay tuned for that. And of course we hope the tool is something that's useful for the 2021 U.N. Food Summit.

So let's take you through a couple of country case studies. So I'm going to do one, and then Lawrence will take on some others.

So of course vegetables are a mainstay for healthy diets. They're important. They're rich in micronutrients, they're rich in fiber, and they're part of the WHO guidelines of eating 200 grams a day of vegetables every day. So what's going on in Bangladesh, a country still reeling from micronutrient deficiencies and undernutrition. Well, when we look at the consumption of

vegetables in Bangladesh, it's a third to that of India. Well, what's going on there? Well, the price of vegetables relative to cereals in Bangladesh is twice that of India. So they're more expensive. The supply of vegetables in Bangladesh is half of India's. So something's going on in the food supply chain, so let's look at that.

Well, what about losses of vegetables? When you look at vegetables over time actually there has been a decrease in the loss of vegetables at the farm gate since 2000, with only about 8% of vegetables being lost. That's not so tragic. It's not so bad. But looking at what is produced in the country – and what is circled is showing you Bangladesh compared to Southern Asia compared to the world – you see that Bangladesh's vegetable production is very low. So they have a real dearth in how much they're actually producing, which probably contributes to the increased price and the low consumption in Bangladesh year round.

So the Dashboard allows for you to ask a question and start to work back into the food system to try to figure out what could be some of the issues that are contributing to that potential problem or that potential solution.

Lawrence, over to you.

## **Lawrence**

Thank you, Jess. So this isn't just for policymakers. It can be used for businesses. And here there's an indicator that talks about agricultural infrastructure. And agricultural infrastructure is really important for doing business. If the transaction costs of moving food and inputs around is high, that's going to be a real disincentive for businesses.

So here we have an indicator called the Agriculture and Infrastructure Index, and a high score is good, and a low score is not so good. So many businesses may be thinking, well, Kenya is a really great place to do business, and there are many reasons why it is. But the agriculture infrastructure in Kenya, the score is 24. Next, please, Jess. And yet in Ethiopia the score is almost double. So agricultural infrastructure in Ethiopia is actually twice as good as Kenya.

And next, please, Jess. And in Mozambique it's the same as it is in Ethiopia. So if you are new to the region and you're entering the region and you're thinking – where is a good place to do business? – you'll be looking at sort of 12 or 15 different indicators. One of them will be agriculture infrastructure, and you will be surprised. Your priors might be challenged by the data in the Dashboard.

Next one, please, Jess. Again if you're a business and you're thinking about: The demand for nutritious food is increasing, all these people are talking about it, the middle class is growing. I want to be able to meet that. I want to be a business that meets the challenge of that increasing demand for nutritious food. Where is the best place for me to do that? So one of the things you might be looking at is the cost of nutrient adequacy as a percent of overall household food expenditure. Now, if the cost of a nutrient-adequate diet is more than a hundred percent of what a household is spending on food, it's going to be really difficult for you to do business in that place. Yes, there'll be lots of sub-national variation, and we will talk more about that later. I'm sure we'll get questions about that. But at a national level, you're thinking India: Well, it's 58% of a household's food expenditure will get me a nutrient-adequate diet. So that's kind of in the realm of possibility. I'm thinking affordability is not going to be the main constraint. It's not going to be an impossible constraint. But if I go to the next slide, I'll see Ethiopia. The cost of a

nutrient-adequate diet in Ethiopia is 155% of what households spend on food. So clearly affordability is just a massive issue here, and it may not be so much about persuading consumers to buy healthier food, it's just about making healthy food and nutritious food more affordable.

Next, please. So the last example, if I'm a business, is – I'm a business; I notice. I'm really interested in adolescents. Most businesses are interested in adolescents as customers no matter what the sector is; because if you can hook them in, you've kind of got a customer for life. Many of you look back to when you were adolescents. Many of you perhaps are adolescents. But looking back to when you were adolescents, there are foods that you still like to eat that you first were introduced to as adolescents. So it's a very important time when preferences are shaped and brand loyalty is established. So you look at Thailand, and let's say you're interested in fast food. And you look at Thailand and you think, okay, the Dashboard tells us in Thailand fast food is purchased three times a week. That's quite a lot.

Next slide, please. But you also know that in Thailand child and adolescent overweight rates are 22%. That's high. That's really high – 22% of children and adolescents are overweight. So you're thinking, here's a possibility. Can I produce a healthy fast food, because I know there's a major health problem in Thailand around unhealthy eating? I know that adolescents purchase a lot of fast food. Are there any possibilities?

Next slide, please, Jess. I also know that the cost of a nutrient-adequate diet in Thailand is really quite low. It's a third of what households spend on food. For that, for a third of that, I can get a nutrient-adequate diet. So the price of healthy foods doesn't seem to be a major problem.

Next, please, Jess. So if I'm looking for a healthy fast food out where there is a major public health problem, healthy foods are not excessively expensive, and I'm looking for adolescents that consume a lot of fast food, I'm going to be thinking Thailand is a potential opportunity to invest in healthy fast food.

The final slide here is just to say that the value of this Dashboard is in comparative work. There are countries keenly aware of what their neighbors are doing and how well their neighbors are doing, and that's one comparison we can make. But there are also comparisons in terms of the food system type. And here's an attempt by the Dashboard team to construct five different food system types. And these food system types are really interesting because the diet and nutrition variation within a food system type is highly, highly variable. And so that also says – Look, the future doesn't have to... is not set in stone by the food system I have. All the countries with the purple food systems, they've all got very similar food systems, but they've got very different health and diet outcomes. So there is some flexibility even within your existing food system to change diets and nutrition. There is agency for governments, there is agency for business, and there is agency for consumers. I think that's it, Jess. Thank you.

One final point, Jess, before I hand it back to you. We've got a Food Systems Summit coming up in 12 months. We know we have to transform our food systems if we're going to achieve health, climate, biodiversity, livelihood and resilience outcomes. That is going to require political will, political commitment. It's going to require imagination; it's going to require collaboration and determination. But it will also require data. And this is one of the best platforms around for food systems, and we very much hope that the action tracks and the cross-cutting leaders will use the Dashboard to inform their deliberations and discussions. Jess, back to you.

## Q&A

---

Jessica Thank you, Lawrence. So I think that we'll just take a couple of burning questions if there are any.

Q *Yes, we do have some questions from the audience, so we have one from Krista Muruca with OCP, an African fertilizer company, and they would like to take a look at the Dashboard to see if it can be a tool to learn and strategize in advance of the U.N. Summit. Do you have any comments in regards to how that can be possible?*

Jessica Lawrence, do you want to take this one?

Lawrence You know, you can reach out to us, reach out to the team. There's an email on the Dashboard site, and we read that regularly, and we answer every question and every comment. So, yes, we're very anxious to engage with users. If this Dashboard is just a data dump, we've failed. If this Dashboard is just used by researchers, we've failed. We need this to be used by policymakers and business leaders as well as researchers.

Q *Great, so we have another question from Sarah Schwartz from the ADM Institute for the Prevention of Post-Harvest Loss at the University of Illinois, and they're hoping to learn how they can use this tool to help them in their work to help smallholder farmers reduce post-harvest loss. Are there features of the Dashboard that you would like to highlight in regards to that work?*

Lawrence Jess.

Jessica Yeah, right now we have some data on food loss of certain commodities, but we really want to strengthen that. We're looking also at food waste data – how can we incorporate some of that waste data. FAO has a new food loss index that we're quite keen to have on the Dashboard. But I think we need to strengthen the food loss and waste data as we get it. Right now we lean on FAO Food Balance sheets for that data at the moment at the national level.

Lawrence Jess, can I come in on that?

Jessica Yeah, please.

Lawrence The beauty of the Dashboard is that it not only monitors food loss and food waste, it helps you to figure out what's going on. Why does one country have a high level of loss of vegetables and another a low level when they seem to be at roughly the same income level, the same type, the same food system? So there's data in there on electricity coverage, there is data in there on quality of infrastructure, roads and infrastructure, and there's a whole bunch of... There's data in there on regulations around food safety. So you can get a bead on the problem, but you can then have circles emanating from that problem that give you some clues as to what's driving the problem.

Q *Great, thank you. So we have a couple more questions, and let's see if we can get to both of them, but let's start with the first. They are asking, from Morgan Day and Ellen Franzenberg – I've added the questions together because they are a bit similar. What are some of the new challenges or opportunities that presented themselves with a new data*

*visualization from the Dashboard that weren't as apparent before? Similarly, Ellen asks – When will the features of Diagnose and Decide that Dr. Fanzo mentioned be available and what are the challenges that you're facing with that development?*

Lawrence Sounds like a question for Jess.

Jess And Alexa and Ty probably can speak to this as well. So the Dashboard currently, we've tried to map indicators across the food system. What I think we're all a bit self-critical of is – what are the connections between those indicators. Now, Lawrence and I kind of did a view of how you would potentially connect those. But maybe those who are not as knowledgeable on how to make those connections, we need to work on that on the Dashboard. And I think we're all quite self-critical. We need to create more of a systems lens to the Dashboard. For those who maybe it's not as intuitive to navigate through it and start to ask questions that they see a strange data point. On the Diagnose and Decide, they're not easy tasks to do. We have a whole Diagnose team that is trying to set thresholds across indicators, some of which don't exist, so how do you create cutoffs or thresholds of doing well versus not doing as well?

And on the Decide, this is work being, as I had said, done by Corrina Hawkes where she's looking at – what are the best evidence-based policies that every country needs to take on, which every country is dealing with food system challenges. And that's why she calls them the "No Regrets Policies." What are the best bets, and what are the policies that every country should do to improve diets and nutrition, particularly, is what she's looking at. And we could ask the same question of policies for climate resiliency and climate-smart food systems. So that work is going on where she is undertaking quite a laborious process of going through... What I think she started with, Lawrence, was like almost a hundred policy actions.

Lawrence 200.

Jessica 200. And she's getting... She wants to get down to 10, but she has a longer list of about 40 that we may include in the Dashboard along with the 10 "No regret" policies that we would then link to the results of the diagnostics. So if countries have a set of diagnostics, what are the different policy actions you could take to address some of those diagnostics? And we're considering working with Johns Hopkins University's Applied Physics Lab who are specialists in AI, artificial intelligence in developing something they call "food games," a lot like war games but using some artificial intelligence that the Dashboard actually learns how to... If you get certain diagnostic outcomes, how do you link to different policies? It's a complex endeavor, though, but it's a dream that we hope becomes a reality.

So we are hoping to have the first version of the Diagnose and Decide in the New Year, in the early New Year.

Q *Thank you very much. We do have a couple other questions, but we'll save them for the next Q&A session after Alexa and Ty do their presentation, so I'll pass it back to them.*

## Jessica

Great. So let me quickly introduce Alexa and Ty. So Ty Beal works at the Global Alliance for Improved Nutrition. He has been with us painstakingly throughout the entire development of the Dashboard and was a key player in its development. He's a graduate of UC Davis, great on data and is a quantitative machine. And he's been incredible.

And we also have Alexa Bellows. She's getting her PhD at the Johns Hopkins Bloomberg School of Public Health. And before that she was at Harvard. And she is our diet/health/nutrition guru and has been also incredibly pivotal in getting this Dashboard up and around. And we thought these two teammates would be best positioned to talk about what they're excited about on the Dashboard, what they think are some interesting features, and they're going to delve into that. So take it away. Who's going first, Ty or Alexa? Alexa, go for it.

## Alexa Bellows

Thank you. Okay, I'm going to share my screen. Okay, did that work? Can you see the side?

## Jessica

Looks great.

## Alexa

Awesome, thank you. Okay, so, hi, all. Thank you for joining us today. I am really excited to be here. As Jess said, my name's Alexa Bellows, and I'm a third-year PhD student at the Johns Hopkins Bloomberg Source of Public Health. I joined the Dashboard team in the summer of 2019, and it has been a really great experience seeing the Dashboard be built, launched, and now people are using it, hopefully. And Dr. Fanzo and Dr. Haddad asked me to share with you all my favorite aspects of the Dashboard and what I think are some of the coolest aspects of the Dashboard.

So first I'll start off with my favorite aspect of the Dashboard. And my favorite aspect of the Dashboard may be a bit nerdy, but I really love the content that we created regarding the food system and how we've organized the data of the Dashboard.

And so one of the three main portals of the Dashboard is the About Food section, which is meant to give a brief overview of—what is a food system, the different components of the food system and why food systems are important. And we really tried to write this in a way that would be engaging for all users, not just academics.

And in this section we present and describe the food system's framework we use that Dr. Fanzo mentioned. This framework was adapted from the High Level Panel of Experts Food Systems framework, and this is what we use to organize all of our data. In addition, we have a brief description of the food system's drivers, the components of the food system, and the food system's outcomes. And I think this is a really nice overview for users who may not be as familiar with food systems or a specific aspect of food systems. And in addition, at the bottom of this About Food Systems page, we link additional resources and references for those who are interested in further reading.

And so as I mentioned, we use the framework throughout the Dashboard. So if you go into the Compare and Analyze section, you'll see all of the data is organized according to this framework. And so if we go to the Food Environment and we click on the sub-component Food Availability, we will see a list of indicators that describe this aspect of the food system. And a lot of thought has gone into the organization of the data and where each indicator best fits in the food system's framework. Organizing the data in this way really helps the user maintain a systems perspective, and we can see we have diet and nutrition indicators further downstream, while food supply chains are further upstream. And in the examples that Dr. Fanzo and Dr. Haddad showed earlier, organization of the data helped us think through some of the potential upstream causes of the outcome. And due to the large number of indicators – I think we have over 170 with almost 200 coming in the New Year – this organization is really key to preventing it becoming overwhelming, or a data dump, as Dr. Haddad mentioned earlier.

And then, finally, I was asked to describe what I believe to be the coolest aspect of the Dashboard. And my colleague Ty is going to show some really cool ways to visualize the data. So I'm maybe going to show what I think might be one of the more useful aspects of the Dashboard.

When we click on the Dietary, Energy and Food Supply indicator, we see a geographic variation of the data. But also what you can do is you can click on this little eye button at the top next to the indicator where you will get information on the metadata. And in the metadata we include the indicator definition, the indicator's relevance to food system. And the relevance section was something myself and two other PhD students, Quinn Marshall and Lais Miachon took together last year. And it was a really helpful exercise to ensure that each indicator we were including in the launch of this Dashboard had a clear relevance with food systems that could be described in one or two sentences. Also in this section you could look at information on any additional calculations we made, how we treated missing values in the math. And then if you scrolled further down, you would see a link or information on the original source of data, and any additional links we may believe to be useful to the user.

And so I think my time is almost up, so I'm going to turn it over now to my colleague, Ty Beal. Thank you.

## **Ty Beal**

Thanks, Alexa. I'm going to share a live screen here on the Dashboard, so we're live on the Dashboard, [foodsystmsdashboard.org](http://foodsystmsdashboard.org), and I just wanted to quickly show one of my favorite features, which may surprise people, but I think it's the Range Chart. So when you're on the Dashboard on the Compare and Analyze page, if you click on the top right icon here on the sidebar, it ranks all of the countries for that indicator. So you can look at... This is Minimum Dietary Diversity, which is an indicator of nutrient adequacy for young children. You can see which countries are really struggling with that indicator. And you can rank. You can sort these countries either direction, so you could see which countries are doing well and which are doing poorly.

You can also go by region, so if you want to compare regions, we can see which regions really have the best dietary diversity. Here we see South America, whereas Southern Asia and Middle Africa have the worst dietary diversity among children.

I'll also select another indicator just to see here. So if we look at anemia and we're looking by country, we can sort the prevalence of anemia among women. So you can see where anemia is

highest, where it's lowest. Interestingly, even in high-income countries – anemia is actually pretty high – one in particular that is interesting to see is that anemia in Japan is actually the same, about the same prevalence as it is in Ethiopia. So Japan is 22%, Ethiopia is 23%. And I use this all the time when I'm doing research or just looking at the information.

Then if you try to think what is kind of described as maybe the coolest feature on the Dashboard, I would have to say it's the bubble chart, because this goes back to the question that Dr. Fanzo was addressing, which is really about – how do you understand the relationship or the correlation between variables? And we are certainly going to work more on this data point for going forward, to make it easier to see that.

But if you want to see the relationship between variables, going to the bubble chart is the best way. So right now we have bubble size representing the population size, so you can see India and China stand out here. On the Y axis we have anemia of women, and on the X axis we have the share of... Oh, this is actually a dietary, energy and food supply.

I'm going to select a new indicator here so you can see how this happens. So Food Availability, I'm going to share dietary energy from cereals. So this is an indicator on the X axis that really shows dietary diversity among the whole population. If you depend more on cereals, roots and tubers, you're less likely to have a diverse diet and less nutrient-rich. So you can see a clear correlation here with anemia and women of reproductive age.

You can also view this by region. These are... Each bubble here is a region, food systems type, which Dr. Haddad talked about, and Economic Classification. And so we can look just for, just to look at one more indicator, I'm going to put Minimum Dietary Diversity on the Y axis, and on the X axis let's do a supply of eggs. So here we can see it's not as strong of a correlation, but it's a pretty decent correlation to say that the higher the supply of eggs, the more likely that the minimum dietary diversity is going to be higher or adequate.

So that's a way to explore the relationships. You have the variable over time, you have the variable, the bubble size, you have the Y axis and the X axis. And you can look at that all together. I'll stop there.

## Q&A

---

Jessica Great, thank you so much, Ty and Alexa. We'd like to take a couple of questions from the audience.

Q *Yeah, let's start with one of the easier ones, because the other two will probably take quite a bit of explaining. The first is from Krista who is a data scientist at John Deere. The question is – What software or platform was used to make the Dashboard?*

Jessica Ty, do you want to want to take that?

Ty Don't know exactly, but it was... The company was iTech that developed it, and they used software development tools, web development tools. I don't know the exact information. You could ask it on the contact desk page if you're interested.

Jessica And they did... They also worked on some other dashboards. What they're most well-known for is the Sustainable Development Goals Dashboard. And they also have a competing with Hopkins, a COVID Dashboard, which is actually quite snazzy. But they've been doing a lot of work on some of these global dashboards across various disciplines and sectors in sustainable development. So, and that's led by Arun Kapuria at iTech, and they're based in Delhi.

Q *Great. So our next question – it's quite a big one for Dr. Fanzo. How do you create the proper threshold for what doing well versus what not doing well means? This is a critical challenge facing researchers and helping to define the Diagnose aspect of the Food Systems Dashboard.*

Jessica Right. I will let Ty and Alexa tackle that because they're on that team and have been working much harder than I have on that, so... Ty, do you want to take this or...?

Ty Sure, yup. So that's a great question. It's what we're kind of wrestling with right now. There are some indicators that have clear definitions in the scientific literature or consensus among kind of key stakeholders about what the thresholds should be for something. Let's say stunting – there have been papers out that have really analyzed, so there's been consensus about what do we consider a real public health burden and what do we not. And the challenge is that each of these indicators really depends on... It depends on the indicator, and it hasn't always been analyzed.

And so every indicator will have some aspect of subjectivity to that, but what we are doing is we're going to be transparent about the methods that we use, and we're going to make the kind of consensus statements among the team. So when we have issues that may be controversial, exactly where do we draw the boundaries for what is considered a problem and what is not. We're going to really try to be as comprehensive as possible, consulting the experts and really among the team discussing some of those points.

And so, yeah, it's a work in progress, and we are really considering the implications of that. We want to choose indicators that are fair and that generally can be..., we can really provide some guidance across countries. There's always going to be exceptions; and so where there are exceptions, we will make every effort to not try to force certain country food systems to be the same as every other country nearby. So we're trying to figure out exactly how to do that.

Lawrence Yes, can I come in on that?

Jessica Please.

Lawrence I feel really quite strongly that we need to do this. And it'd be easy not to do it. We'd have a much quieter life if we didn't do it. And I think it would be less useful, and we would be less provocative. So as Ty said, we probably will end up being quite provocative, but you'll see exactly what the assumptions are. And then we start a discussion about how valid the assumptions are and whether they work for a particular context or not.

So it's a very transparent, open process, lots of partners. We want it to be as inclusive as possible. Thanks, Jess.

Jessica Alexa, did you want to add anything onto that?

Alexa I think it's mostly what Ty and Dr. Haddad had said, that it is a complicated process, and it's one that we are thinking through very carefully. Ty and I have been in many meetings where we just keep going through these indicators and talking about – are these the ones that should be included in the Diagnose section; and then if they should, what are those cutoffs? What cutoffs are available currently? Are there multiple cutoffs that are presented, and which one's best? And so that's something that we continue to document as well along the way so to ensure that all of our thought process will be very transparent at the end.

Ty And just to add, Jess, one more thing is that we have really, we've made histograms of the distribution for each indicator. And that's been really helpful to see how these indicators vary? Are they bimodal? Do they have one? You know, does it have a normal curve? So we can really... It helps us kind of identify what are the clear cut points where you have different types of countries that fall into different categories.

So I think as we are getting feedback – you know, we welcome more feedback; you can do that through the website – we may even provide histograms on the site. I mean we can provide whatever is necessary to make people feel more confident about what we've done, at least to understand, here's the reasoning behind the decision. There's going to be controversies – that's kind of inevitable – but we'll do our best to be really clear on that.

Q *Great, thank you. So you did touch on this question a little bit, but if you could expand... This person asked – Can you speak to your process, in other words, the literature basis, stakeholder engagement and information, etc., of deciding on things like relevance and other more subjective aspects of categorizing data on the Dashboard?*

Jessica I'll have Alexa take this one.

Alexa So we've actually been very careful when we started including data in the Dashboard, of making sure that this is data that fits in the framework that we consider to be the food system and so we're just including every data point that we could potentially add; because that would just be too much and potentially overwhelming. And so that's one thing that we thought through.

We also have thought through, as Dr. Fanzo mentioned, that most of the data that we want to include on the Dashboard is representative of most countries or at least a majority of countries of a certain income class or continent, to make sure that it's not just... There's a lot of data specifically in high-income countries on food systems, but we just didn't want to be predominantly high-income country data in this Dashboard. We want it to be a more global focus and inclusive. And so we have a list of criteria of how we're including the data.

And going forward now after we've launched, we're getting a lot of requests of like including new data. And to do that, we are going through a review process to see if this new data meets our criteria. And then it will go through an expert review as well. Where two of our experts, or if we don't have an expert on our team, we'll send it out for an external review to see if it should be included in our Dashboard. And I believe that methodology should be up on our Dashboard site in the near future. That's something that we wanted to include.

Q *Thank you. I appreciate that. Any other commenters before I move on to the next question? All right, great. Well, this question comes from Ana. Ana Bilik is the president of Tanager International, actually. So she asked – The Dashboard is a great resource, particularly at a macro policy level. How can the tool be used at a sub-national level for intervention and investments? Many remarks through this week's Dialogue point to the need for place-based solutions?*

Jessica Great question. Ty, you want to take that one?

Ty Sure. So I think overall getting a national picture is useful, even if we know that a lot of decisions are made contextually or for sub-national regions. So I think it can be useful now to help guide that and provide some context. But really we've seen that as a big gap. We've had a lot of feedback on the need for sub-national data. And so what we've begun to do is we developed kind of a template, a guidance document, to provide to countries or cities that are interested in having a sub-national Dashboard that can guide them through where does this data that you have fit into this food systems framework? What type of data and indicators should you include? What does that data look like? And Alexa has been really helpful with this, helping describe what type of characteristics about that data do we need?

And then we are in the works of trying to develop the sub-national aspect of the Dashboard, and that should be for different administrative divisions, provinces, districts, etc., as well as spatial data that can display maps of continuous surfaces so you can see really granularly how do these indicators represent themselves. It's of course going to be dependent on the data itself. We have some indicators, like the local burden of disease data on child growth, that are available at high spatial resolutions globally. But most of these indicators are going to be different for each country.

And so the plan is that we may have sub-national data platforms for specific countries, and that's going to be on a case-by-case basis as we discuss with countries that are interested and figure out how to organize the data in a really meaningful way in the food system.

Q *Great, Thank you. Any other comments? Go ahead, Lawrence.*

Lawrence Just something on the sub-national, we really recognize this is absolutely essential. But we're kind of a victim of what's out there. I mean we're not creating new data; we're essentially aggregating, organizing and quality screening data and making it user-friendly and trying to link it across indicators. So we're kind of dependent on what's out there. But we are conscious of the fact we need to do more on the geographic side.

We're also conscious of the fact we need to do more on the temporal side. A lot of the data only get updated once a year, maybe twice a year, and that's very slow-moving in this fluid, dynamic situation we find ourselves in. And so we will be doing a review of real-time data sources that we can potentially incorporate into the Dashboard. The problem there is that most of them are proprietary private sector, and we have to pay to get access to them. And we have really tiny budgets that we're working on. But thank you for the encouragement.

Q *Great, thank you. So this will be our final question for today. The question comes from Glen from Purdue. He asks – What are some of the biggest environmental challenges in mapping food systems? Additionally, what are some of the biggest political and/or cultural barriers?*

Jessica I can start, and then Ty and others can come in. On the environment side, we're going to be doing a big push in January, Glen, including more climate data as it relates to agriculture, so greenhouse gas emissions per capita, greenhouse gas emissions coming from landscapes. We're going to be having some metrics on land use change, water footprint, I think a biodiversity index indicator. And that work is being led by Rosaline Remans of Biodiversity CIAT Alliance.

We also will include some data that was just released from the World Wildlife Funds planet-based diet, which is looking at country-level diets, different types of dietary patterns and their footprints across greenhouse gas emissions – land, water, nitrogen and phosphorus, nitrification, acidification use. And so we'll have some of that, and the way I've described that is, you'll see the limit. We've got a lot of climate data on production and what's going to happen to the environment and climate on farm landscapes. And we've got a lot of data on diets. Now, even both of those areas are flawed. Where you see the climate modeling when you're looking at food systems is you don't really see anything in the middle, that missing middle. So what's the impact on the environment? What's the impact of climate on transportation? What's the impact of packaging, processing. There's very little data on that. And there was actually a call in the *Lancet Planetary Health* this week on even ultra-processed foods. What's the environmental footprint around those highly processed, unhealthy foods that is increasingly being consumed around the world?

So we have sort of the two ends of the food system, and we're going to be pushing data on that – so the production side and diets. But it's that whole middle space where there's not a lot of data, particularly that's representative across countries.

I don't know if anyone wants to add onto that or to address the political or social.

Lawrence Just on the tradeoffs between environment, health and livelihoods, most of the literature on that is from high-income countries. We just desperately lack an evidence base in low- and middle-income countries for those tradeoffs.

Jessica So, Amy, I think we'll move on if that's okay?

Amy Yes, that's great.

Jessica Okay, so we are very excited to now introduce our winners of a competition that we launched. This is Lawrence's idea to try to garner interest in the Dashboard as well as to see how people are using it and see some of the ideas and the creativity out there around the Dashboard. And we launched this. Didn't give it a whole lot of time; it was maybe not even a month ago – right, Lawrence? And we got some really great entries, and we have some winners that we'd like to announce. So I'm going to share my screen.

Okay, and so our first place winner is Ramya Ambikapathi who's at Purdue University. She's a post-doc there, and she's a graduate of Johns Hopkins. I always have to say that, Ramya. And she won the first prize, and she's going to be presenting, and I'll highlight all the winners and then have them present. And so Ramya got the first prize of a thousand dollars, and this was graciously provided by GAIN. So congratulations, Ramya.

We had three second-place winners, and they're all here. We have Destan. I can never say your last name, Destan. From HarvestPlus. She also was a Hopkins student for a summer, so it's great to have her. And this was no bias. I think, you know, this is all by coincidence that we had some former Hopkins people with us. But she got second prize along with Jane Arinze-Egemonye from the Civil Society's Scaling Up Nutrition in Nigeria. So congratulations, Jane. There she is waving her hand. And then also Riley Wilgenbusch. I hope I'm saying your last name correct, Riley, from Iowa State University. So those were our first and second prizes.

Lawrence May I say something before you pass over to the winners?

Jessica Yeah, and then I'm going to show the third prizes, too, Lawrence.

Lawrence Okay, great.

Jessica They get mentioned. So the first prize won a thousand dollars. The second prize was 500. And then we had several third-prize winners. Delani Vinzant, Brett Taylor, and Merci Nani from University of Missouri. We had another University of Missouri group, so this is obviously part of a class, I think, of an assignment and they turned it in. Evan Twitchell, Nevin Alexander and Sintha Santosa. So congratulations. Isabela Acenas from New York University – hope she's doing okay in New York; they were hit hard by COVID, a rough place to be during a COVID pandemic. Noah Byrne. And we wanted to give Noah an honorable mention because he's 13 years old, and we were so thrilled to have a young person working and trying to examine the Dashboard. So we were really happy about that. So, congratulations, Noah. Pelumi Olawumi Aribisala at Cato Foods & Agroallied Global Concepts and Tamene Taye Asayehu from the Ministry of Agriculture in Ethiopia. So they won the third prize for \$250. So congratulations to everyone.

Lawrence, I'll let you say a few words, and then we'll have our four presenters or winners present their work.

Lawrence Thank you, Jess. I just wanted to say that we went through each of the applications. Seven reviewers went through the applications – Jess and myself, two other people from the Dashboard team, and then we had three externals. And they were obviously evaluated blind. We didn't know who was submitting them. And the criteria were: relevance for food systems, the rigor of the approach, the originality and creativity of the approach, and then the potential for impact. So those are the criteria, and we had seven blind reviewers, and then we did a moderation. Over and back to you, Jess.

Jessica Great. So we'll take it in order. Ramya, you'll present first, and then Jane and then Riley and then Destan. Go for it, Ramya.

Ramya I'm going to share my screen. Can you see?

Lawrence Yup.

Jessica Looks great.

Ramya Okay, great. Good afternoon, everyone. Thank you so much for picking my entry. I'm really thrilled to be here. And this is actually an extension of my dissertation work, so I'm really excited and feels very personal, too.

So my winning entry is on decision-making on climate shocks for countries with seasonal food systems. And I was interested in food access indicators during reoccurring climate shocks caused by el niño southern oscillation or ENSO. So ENSO's a naturally occurring phenomenon that causes changes in weather patterns across the world.

And it happens in two phases the el niño and the la niña phase. So I have that in the panel on the right. So under el niño phase, there's a global mean temperature is usually warmer and it's dryer. And then under la el niña conditions the global mean temperature is cooler and it's generally wetter. So under these conditions they affect rainfall, they affect temperature, they also affect river discharges along the route.

And studies are coming out showing that these effects, they affect crop productivity, food prices, market access, food availability, diets and obviously livelihood. So I was interested in ranking these countries that were affected by ENSO under various food access indicators and their resilience during these recurring climate shocks.

So these – I just picked a few. I just picked a couple of these countries. They're mostly in Central America, Latin America, Southern and Eastern Africa and Southeast Asia. And then I picked three indicators to just illustrate what I was trying to look at. So a measure of staple food access over time, or like seasonality or seasonal food system is per capita supermarket access. The idea is that the more supermarket access there is per capita, you are less likely to have seasonal food systems. And then a measure of food availability – I looked at a couple of different things. One that I presented here is dietary energy available, so this is the first per-capita total calories available per person. And then the measure of economic resilience is the per-capita remittance, which I was really surprised that the Food Systems Dashboard had it. And I used these three measures to rank countries that are affected by ENSO.

So from the Food Systems Dashboard I created a bubble chart, which I also think, Ty, is one of the coolest features. And so I was happy that you mentioned it as well. On the Y axis is the per-capita dietary energy, and on the X axis is the supermarket access per hundred thousand folks. Again, the contrary of that is that the lower supermarket access has been more seasonal food system. And then each of these bubbles represent a country, and then the bubble size represents the per-capita remittances.

What we generally see is that the more stable the food systems, there's a great energy available. And then these countries here at the bottom that are affected by ENSO, for example, Zambia has the lowest per-capita remittances. So we can hypothesize that these countries have a longer wait of recovery from climate shock compared to other countries that are also affected by ENSO.

I do want to mention there are different phases of ENSO that affect different countries, so it's not always temporal or the same effects. And then one other measure is to ensure that social vulnerability and economic resilience, how they affect the adaptive capacity of these countries.

I'm going to show you another example, which I didn't submit, but I was interested in looking at the supply of vegetables. Again, you see a really nice linear or somewhat linear relationship that the more stable food systems have a great vegetable supply. Again these countries, Ethiopia and Zambia might be more affected. And they are very low to begin with in terms of supply per person per day, so, and then under ENSO shocks, these countries might be more affected compared to these countries in terms of their vegetable supply.

And then, finally, I also looked at supply of fruits over supermarket access. And again it's beautiful linear relationship when you see that more stable food systems have greater fruit supply, and then these countries at the bottom might be more affected by ENSO shocks.

So these sum up the hypothesis I'm really interested in testing. One thing I was looking at in addition to economic resilience is also social equity. And I really like how the Food Systems Dashboard has some gender inequality index, so that's something I'll be exploring. Thank you.

Jessica      Fantastic, Ramya, and congratulations again. Okay, great. Jane, take it away.

Jane          First of all, I want to thank Cornell, the team that put the Dashboard together. I want to thank you all for the opportunity. You did an amazing job, and I'm so in love with the Dashboard. And so my entry is to put together an educational children's book.

So growing up for me was hard, because I didn't have a good relationship with food. I didn't understand why everyone wanted me to eat, especially vegetables, fruits, and, you know, staple foods. So I think I had a very rough relationship with food. And unfortunately for me or fortunately, I had two younger brothers who were born in less than two years. And then I had a working mom. And so my younger brothers would take my food, and I didn't care. And it's mine, and, yeah, that was very interesting for me. And growing up, I didn't have an idea about why I should eat certain types of food and why I should even eat at all.

But over the years I have worked with Scaling Up Nutrition in Nigeria. And that has given me knowledge of what jobs are. In Nigeria we have higher rates of malnutrition. I think we are the second or the third largest. We have the second or third largest number of stunted children.

So there's a huge gap in nutrition knowledge and more about communication of nutrition data to stakeholders. In 2018 I published a recipe book to provide caregivers with adequate knowledge on how to provide nutritious food for children from 6 months to 6 years.

And so I started another book this year. And when I saw the Dashboard, I really fell in love with the data the Dashboard was presenting. And I started using the data on the Dashboard to publish the book. So in the books, kids would be..., the children would learn where food comes from. You can see the contents – how long you want to go on without food, does it matter how much you eat, and nutritious food and how nutritious food can keep them healthy.

And we are going to use a lot of information we're getting from the Dashboard to put it into the context of Nigeria and then see how children can have relationship with food and then understand what the food system is all about. And also how their food choices affect investment into overall food systems.

So for me my dream is that this educational book would drive commitment for the next generation of leaders by ensuring that they have a strong understanding of food systems and enable them to better interact with their food environment.

So I'll move to the next slide on what I think is missing on the Dashboard. So for me, when I looked at the data, for instance, the share of employment in agriculture or adolescence prevalence about weekly fast food consumption. I would want gender specific data We want to understand. So if in the area of share of employment in agriculture, what percentage of women are involved in the agricultural sector. And what percentage of men are. It will help us drive the need for gender equality in the agricultural sector. And I think for the children the world wants to know why, if we have women farmers and what. And as they get older, they can make real choices in the agricultural sector without thinking that, okay, so this sector is just for men only. But then that's a dream women are a part of that sector as much as men. And that's what drives advocacy for gender equality. And also I want to say, so in the case of like this, I would want to see gender disaggregated data.

And then second, be something like I'm trying to interest in something, it was to share stuff and create discussion on social platforms. So I was hoping and thinking that the Dashboard would include social media ad campaigns so that we can easily share on social platforms and engage and lead discussion around the different indicators and see how we can discuss more and share more with colleagues or friends and everyone around us. Thank you so much, and I look forward to working with partners in Nigeria like GAIN, Action Against Hunger and the Sun Movement and so I achieve my dream of publishing this children's book. Thank you so much for having me. Thank you for everyone for the opportunity.

Jessica Okay, thank you, Jane. So we've got about eight minutes left. So Riley and Destan, you can keep your talks to three minutes, and then we'll quickly close. Riley, go ahead.

Riley Excellent. So thank you, Dr. Haddad and Dr. Fanzo and all of your colleagues for your hard work putting together this Dashboard. And it was really a pleasure to use for this. My project was fairly similar to Jane's in that it was targeted at youth education. And so what I've done is I've worked with my elementary school back in Central Iowa to go through a presentation on food security following an internship I completed in Kamulit, Uganda.

And so every year prior to the Thanksgiving holiday here in the United States, our high school agriculture students work with second-grade students to package meals that are sent to East Africa through Meals for the Heartland. And so then trying to get some background to the second-grade students about what food insecurity is and why it's important that we're packaging meals for communities in East Africa. So after I returned from my internship, I was asked to come back and speak to the second-grade class about my experiences.

What this Dashboard allowed me to do was incorporate some data within my personal anecdotes so that it wasn't just me talking to them about what I saw, but it gave them a little bit of real context for the situation in East Africa. But it's important to remember as I go through the rest of this presentation that my audience was oftentimes more interested in the question—Have you seen giraffes while you were there? So there are a lot of facets of the Dashboard that I used while teaching world food issues classes here at Iowa State, but I included only a few critical data visualizations with the second-graders.

So even though the students are mostly interested in my experience with giraffes, they perhaps unknowingly asked some thought-provoking questions during my presentation when I gave it last year. And probably the one that stuck with me the most was a young girl who asked—why do the women do all of the work? And it's been nearly a year since they asked that question, but I still think about it often.

So for the presentation, I used the Compare and Analyze section of the Dashboard to harness the impact of interactive world maps. And so here I used the Gender and Equality Index Map. And after we determined that half of the class' favorite color was purple, we started to recognize that there were a lot of different shades of purple. And so I was able to explain to them, using this really clear, easy-to-understand visual that women in some of the darker purple-colored countries were not treated the same as men. And so I explained some of the details about gender and equality, keeping in mind that they were second-graders and young children. But even for the second-graders, it was kind of a harsh reality.

So that was a great supplement, though, to my personal anecdotes about what work is being done in Uganda and around the world to empower women and help them find their voice and become strong, independent members of society. And so I think there's a lot of potential for this within youth education, and I would love to see a section of the Dashboard that's tailored to students and educators. I know I personally when I was a young student in elementary school, I benefited from having interactive websites that talked about food security. And I think the

Dashboard is a great platform to start putting together some interactive country profiles so that students can learn about different countries and different ways of life around the world on kind of an elementary level so that they're set up for success in future food security education.

So these discussions have led to several other questions from the students, but I think I'll do all of us a favor and keep the second-grade questions in the second-grade classrooms. But this is an ongoing, growing and expanding project that I love talking about. So if you want to learn more or if you have creative suggestions, please feel welcome to email me at that address on the screen. So thank you again, everybody. It's been a pleasure to share with you today.

Jessica Thanks so much, Riley. Really great, great stuff. Okay, last but not least, Destan, HarvestPlus. You've got about three minutes before they cut us off.

Destan All right, thank you so much, so I hope you can see my presentation now.

Jessica Looks good.

Destan All right, well, thank you. I'm very honored to be here today on behalf of HarvestPlus, and I just want to make a brief introduction on HarvestPlus. They are a CGIAR program working with over 600 partners along the seed to food value chain, and our aim is to improve diets through staple crops. In doing that, we use an innovation called biofortification. Biofortification uses conventional plant breeding to increase the nutrient density of key staples consumed by all. And today at HarvestPlus the delivery efforts have all been biofortified crops benefiting an estimated 50 million people in those 14 countries in Africa, Asia and Latin America. And our objective is to catalyze public, private and humanitarian sectors to embed biofortification in policies, programs and investments. Our vision is that biofortified staples will become the new normal.

But we were very happy to work with the Dashboard team to have biofortification indicated and included in this key tool. And we were excited to see that those many indicators that can help us better integrate biofortification within a food system's framework.

And in the past few months we embarked upon a journey with our key partners to develop a strategy to scale biofortification in a region rather new for us, mainly with the Sahel. Potential for biofortification in this region was already established with our own tool, the Biofortification Priority Index, which helps us identify nutrients for country combinations that would result in the biggest impact for micronutrient intakes. And according to our tool, iron pearl millet and vitamin A maize had significant impacts in the region. So iron pearl millet was released after years of breeding last year while vitamin A maize is becoming available through private seed companies.

And at that moment the next step for us was to define the opportunities for their scaling and to situate biofortification within the Sahelian food systems. And the Dashboard's country profile, especially indicators such as dietary energy gained from foods, consumption, expenditure per capita or a safe status supply of biodiversity all confirms the Sahelian populations rely on some staple crops, and the

lack of nutrients with foods in their diets. Better cereal yields and precipitation affirmed that those biofortified crops, which are developed not only to be nutritious but also high yielding and drought tolerant could actually be liked by farmers in this region.

And based on this information, we are now developing a strategy to integrate biofortification in children's food systems, to strengthen food and nutrition security and resilience. In the future, as we implement this strategy and learn from it, we expect to consult the Dashboard for additional indicators, countries. And we will also revisit the Dashboard as the data gets updated to ensure that biofortification scaling interventions are on the right track.

And just regarding the second question of the competition that was dedicated to suggestions to make Dashboard even more useful for decision-making, I would like to admit we are still learning the ropes of this rich tool, but here are three comments from our site based on our experience so far. First of all, in a country page of the segregational, several indicators such as yield, expenditure, food availability into crops would be useful for those goals that are working on specific crops such as seed companies or the CGIAR.

And then secondly, we were thinking in that especially for larger countries with diverse production and consumption patterns. It could be good to present some key variables at the sub-national level, which we learned today that it's already on the way, which is very exciting. And then, finally, given the importance of malnutrition in public health, it would also be good to include indicators on additional diet-related health outcomes, such as vitamin A deficiencies, stunting and wasting, etc.

And here at HarvestPlus we are very much looking forward to continuing our collaboration with the Dashboard team and using this Dashboard for biofortification strategies. Because I just would like to congratulate and thank the Food Systems Dashboard developers for making this key go-to resource available for all of us towards achieving our collective aim to improve food systems to deliver healthy diets. Thank you.

Jessica     Fantastic. Lawrence, over to you.

Lawrence   Thank you, thank you, prize winners. Thank you, Jess. Look, colleagues who are on the line still with us – you can see how varied the uses are of the Dashboard. I think our imagination is one of the barriers to using it in lots of different ways. These four ways of using the Dashboard, none of us really anticipated. You have very macro-level use of the ENSO level, you have a regional use in the Sahel, and then you have some very important focus, the generational uses. I would never have imagined this would be useful for very young children. So I'd like to just congratulate the winners for your creativity and your entrepreneurship in making the data speak and sing.

So with that, Jess, I would like to thank you for chairing this and your leadership on this. I'd like to thank Ty and Alexa for their fantastic work on this Dashboard. And I'd like to thank the participants for dialing in. And the mantra we have on the Dashboard team is – Use the Dashboard, help us improve it, and most importantly,

like our competition winners, act on it. So thank you so much, everybody, and thank you, World Food Prize team. I think we're done.

Jessica And one other thing. Amy wanted to just announce the next session.

Lawrence Okay.

Amy *We do have one final session for Day 2 of the Borlaug Dialogue, so I was going to quickly plug that. If you are able to attend the keynote with President Gilbert Houngbo of IFAD with special guest investor Ertharin Cousin, please do see your agenda to attend that session. Thank you all so much for being here.*

Jessica Thanks, everybody.