

2012 THE "BORLAUG DIALOGUE"

October 19, 2012 - 10:00 a.m.

Panel Moderator: Margaret Zeigler

CONVERSATION:

THE IMPORTANCE OF FOOD PRODUCTIVITY TO MEET TOMORROW'S DEMAND

Panel moderator:

Margaret Zeigler

Executive Director, Global Harvest Institute

Panel members:

Robert Thompson	Visiting Scholar, Johns Hopkins University
Isidro Ochoa	Farmer & Professor, Zamorano University
Susan Finn	President & CEO, American Council for Fitness and Education
Jeff Simmons	President, Elanco

Introduction by:

Catherine Swoboda

Interim Director of Planning, World Food Prize

For this panel, I would like to introduce our moderator. She is someone who has dedicated her career to addressing global hunger and food security, and that is Margaret Zeigler, executive director of the Global Harvest Initiative.

CONVERSATION:

THE IMPORTANCE OF FOOD PRODUCTIVITY TO MEET TOMORROW'S DEMAND

Margaret Zeigler

Executive Director, Global Harvest Initiative

Good morning, everyone. I hope you can hear me. My name is Margaret Zeigler. I work with the Global Harvest Initiative, and I'm pleased to introduce our panelists. We are going to have a rich discussion this morning about productivity and its importance, and we would like to get started.

So I'm really glad that Ambassador Quinn and the organizers of the World Food Prize have chosen a series of conversations this morning that are focusing on, I think, some not only emerging issues, but they're going to be really critical issues in the next 20 to 30 years, both the post-harvest waste and loss issue, productivity, improving the productivity of food and nutrition. These three conversations that we're having this morning I think are very cutting edge and are only going to become more important over time.

This morning we are going to look at the critical role that improving productivity plays for food security and nutrition and economic livelihoods. Here to help us understand more deeply those issues are several wonderful experts.

First I'm going to have Jeff Simmons come up, who is the president of Elanco. He's going to be our keynote speaker this morning. Jeff is also the senior vice president and executive officer of Eli Lilly and Company. He's been with Elanco for over two decades in various sales, marketing and management positions, both in the U.S. and abroad. And many of you have probably heard Jeff speak before. He speaks with great passion and clarity, and I heard him speak at the Chicago Council G8 meeting in Washington, DC, in May, and he really brought a lot of good perspective and energy to this discussion. We're looking forward to hearing from you, Jeff.

Following Jeff we are going to have a conversation with Jeff and our other panelists. We are today going to introduce Dr. Robert Thompson, who's a visiting scholar at Johns Hopkins University in Washington, DC. He's professor emeritus at the University in Illinois at Urbana-Champaign and most recently held the Gardener Endowed Chair in Agricultural Policy there. He's senior fellow of Global Agricultural Development and Food Security at the Chicago Council on Global Affairs. And Dr. Thompson is no stranger to this topic or the economic factors that are part of addressing our future food needs. He's going to provide a great view on economic implications and trends, and we'll flesh more of this out as we get into our conversation.

Next is Susan Finn, president and CEO of the American Council for Fitness and Education. She has a PhD and is a registered dietitian. She is a recognized leader and respected communicator in the field of nutrition and health.

Following Susan we are going to hear a little bit more today from the developing country perspective. Dr. Isidro Matamoros Ochoa, who is a Honduran dairy, beef, cotton and sugar cane farmer. And he is also professor at Zamorano University in Honduras, one of the preeminent agricultural schools in the developing world. In addition to managing the farming operations and teaching, he's a consultant for many farming operations throughout Central America, in Honduras, Nicaragua, Guatemala, Panama, and also in Colombia. He graduated from Zamorano and also attended Mississippi State University where he got his bachelor's in science, his master's in science and a PhD in animal science production and reproductive physiology. He's going to help us really delve down more deeply into challenges that are faced by farmers in developing countries with achieving greater productivity for food security and livelihoods.

So first I'd like to have Jeff come up, please, and launch us on this discussion with a brief presentation, and then we'll move to our panel.

Jeff Simmons
President, Elanco

Good morning. It's an honor to be here, and I'm excited about the discussion that we're about to have. I guess I'd start with the name behind us and a quote that was mentioned last night and why this conference even exists with Norman Borlaug and a quote that was mentioned last night relative to just really the essence of what this meeting is about, the essence of what that man was about, and the Green Revolution, and just simply the fact that food is a moral right, and all that are born really have the right to food. And that's why we're all here. If there's one common thread, no matter the country, the age, the background, or even the different maybe political or policy positions we have, I think that's common.

I'll start with a slide that I've used traveling around to over 30 global universities this year, and that is food security to the next generation, food security, creating these four words we're all about - safe, abundant, affordable food. No matter where you are, what you do, I think we all agree that's what this is about, and candidly that's what Norman Borlaug wanted his legacy to be and probably what he'd want us to be talking about today. And I think the essence of productivity is critical.

We will live, and our kids will live in this generation that last October we passed the seven billion mark in population, and they say it'll raise pretty quickly to nine billion, and then things will likely change and population will level off or there will be a change. But we will live between the seven and nine billion mark. And I would candidly say, as I say in our global pharmaceutical company or in any university with doctors and energy people and engineers, to say - Hold it a minute. This is, food security, agriculture, food, is the hottest industry, the most critical industry, the most critical issue during this window of time. And we are the leaders, and no question when you come to the World Food Prize. The leaders that sat in that room last night are the leaders that are going to shape really what's going to happen between seven and nine billion people. That's the essence of it.

So in a quick three- to four-minute, what's our playing field that we have. We've all heard these things, but if I summarize to say - here's what I see as the playing field and what many of the talks over the last few days have been about, is, more people live with food as an issue than those that don't. I'll come back to this in a second. Our global population increase, the rising demand - we're going to talk a little bit about something that wasn't talked a lot about so far and also wasn't even talked, I think about 20 minutes, in the whole G8 Chicago Council, was on the animal-based protein - touch a little bit about that today. The environmental impact, the economic constraints, and the public issues. Those, I believe are the six drivers to the playing field that we're on between seven and nine billion people.

If I just hit quickly a few slides through them. First, this whole - more live with food as an issue than those that don't - let me try to put this in context. This came... I lived... Last October I took six 20-year-olds to the largest slum that I was aware of in Kibera and lived in the slums for five days, and it took those five days living in the slum to hit this reality that I'm part of, that's the global income distribution of the world, that I truly do live in a bubble, and I live on that thin green line. Because the average income is \$7,000 in the world, and I had to go realize that.

Then I had a very brilliant man that lived in those slums that led me around for five days say to me something that kind of hung in my heart, and that is 43% of the world, as we all know, lives

on two dollars a day or less. Then he turned to me as we looked out over the slums. He said, "Now, hold it a minute. And also one out of four families in the U.S. and Europe are struggling to put food on the table." So forget about the one billion or the 850 million that are in hunger insecure with food. No. More than one out of two people live with food as an issue. If you take the 43% and one out of four tables that aren't that, you put those numbers together, people that wake up every morning wondering about where and when is my food going to come. I won't starve, but this is a big deal. And this is the essence of the world that we live in.

So that's one reality. The second is just this population increase. We're adding about four, four and a half million per month. We're adding a Chicago and an L.A. every month in population, and that's not going to stop here probably during our working lives here in this room. So that's the population. There's a lot of people claiming the seven billionth baby that was born on October 31 last year. I don't know. This is one mother that's claiming this is the child, but we've got seven billion now, not nearly six billion that I was talking about when we were here a couple years ago. So the population increases.

The other is just this wave of hunger and putting it in the context of really the significance of this. It is the number one health problem in the world. I sit around the table in a pharmaceutical company where there's five presidents. There's an oncology cancer president, there's a diabetes president, there's an Alzheimer's neuro president, and then there's kind of the all other disease, and then there's us. We are in the people business, as I say.

And I tell everybody there, in our company the last 30 days we've had two big breakthroughs, in Alzheimer's and in breast cancer. And the analysts and all the disease people are very excited, and I stop and say, "Hold it a minute. Remember, we're the number one health problem - and, oh, by the way, we've already found the medicine." As Norman Borlaug says, we have the solutions. All this dialogue that we've been talking about today is connecting the solutions. We've got the answers. It's different than Alzheimer's and cancer, but it's as devastating as those. Kills more than AIDS, malaria, tuberculosis, war, combined. And as I say, it's about 60 airplanes a day falling from the sky. So that's the clinical side.

But there's also what I would say in disease terms, a subclinical side. This is where we get to - more live with hunger than those that don't. There's a hidden hunger. That's the getting up every morning, wondering when and where our food is going to come from. In the city I live in Indianapolis, eight out of ten kids in Indianapolis public schools count on a free lunch and a free breakfast. No, they're not going to starve from hunger. But we have a problem in our city, just as probably Des Moines and others, and that is just this longing of knowing and being secure with food around the table or being secure when I go home on the weekend, as many kids in this city will, wondering when and where I will get meals until Monday morning back at school.

So that's a little bit of the context. The other one is the other playing field that we don't talk a lot about. This came out of *Foreign Policy* magazine last year. But there's three billion of the seven billion people - I heard Bill Gates speak on this for the first time - there's three billion people that are on a plant and rice diet that are striving to go across the chasm to eat meat, milk and eggs for the first time - over sixty percent of the demand in emerging markets - and this window between seven and nine billion people are going to strive for, for the first time, meat, milk and eggs. This is important to understand this, I think, dynamic in our playing field.

The environmental impact: Today we're living on about one and a quarter of the world. How do we do this? I think this productivity dialogue here today, we need to touch a little bit on the environmental aspect as well.

And then the public affairs issues, which we know are out there, and the political and the public affairs issues linked to food.

So I see this as – this is our playing field. But I am coming back to, I think, the realities. So let me just end with an example. And I want to end with an example because I think sometimes we lose a little bit of the context with slides and discussions and discussion at a high level. And I had somebody... [Hopefully, my walking mic here – does this work?] ... is an egg. I had to speak to 40,000 employees in our company that most of them didn't know anything about food and agriculture, but there were scientists all over the world in our company, and I had ten minutes. And I decided to dig into the story of an egg.

Why an egg? There's a lot about an egg. First and foremost, this is the bridge between a plant and a rice diet and maybe what you would call a middle class diet. This is the longing of mothers all over the world. When I was in Kibera in those slums, you saw mothers saying, "If I could get my child just one egg a day." Shoot, the table I sat around with mothers in Eastern Indianapolis, it was the same thing.

What's in an egg? And I think Dr. Finn can explain this a lot better than me. It's the calories, the nutrients, the nutrition to totally change a kid. One a day – that's all we need. And this can change brain development. This can change the nutrition. When the brain development changes, the education changes. When the education changes, a lot of people in this room know better than me, the economics and a community changes.

So I'm one of the leaders in Elanco. We are one of the leaders in poultry research. Shoot, I didn't even know until I had to give this talk. And you start to unravel the significance of an egg. What's going on in the egg industry right now? Where are we? Well, I'll tell you right now. From this time to a year ago, there are less eggs per person than there were a year ago. We are going backwards in eggs. Let me show you a chart. If you could show the chart, the next slide, please. Go to the next slide.

This is the situation. I'm going to make you egg experts right now. There's six and a half billion hens in the world, producing about 174 eggs. But if you look down there in the far left or whatever, we have a negative trend going on. We're losing an egg per hen per day. We're going backwards. So when you put that against the population growth, the six and a half billion hens will need to triple, will need to triple if this trend continues. We can't triple, we can't go to 18 billion hens.

And there's three drivers to this negative trend. One is disease. There is a health problem with hens. And as an animal health leader, that's a concern. There's a flu that just hit Mexico, an avian flu, wiped out 22 million birds. There's an egg shortage. Mexico City, in less than a year, eggs are up three times the cost.

Second is just the lack of innovation. There's companies like us not focused and targeted on innovation in the egg industry. Candidly, this wasn't one of the big proteins that we were focusing on, like dairy and beef and poultry.

And the third is animal welfare. There's policies and approaches on how to raise birds that maybe came from a minority voice that actually have flipped productivity upside down and actually increased disease. California would be an example of that, as eggs are up over 20 percent. Egg production is down because of a proposition that was put on a ballot a few years ago.

Those three drivers have flipped this thing upside down, and really the choice then (if you hit the tab, please), we really have a choice of, are we headed to 11 billion more hens, or are we headed to (if you hit it again, please) four billion more. As a leader in poultry research, we must change this trend.

But I come back to more the moral aspect of this. I come back to thinking about Sarah, a young teenage daughter that is sitting with her mother saying, "We just want to be able to provide my younger brother and sister with more food here in Indianapolis," or in Kibera, the slums in Kenya. One more egg a day can make all the difference in the world and can change the cycle. This is more of a realistic, I think, practical example of what we're faced with between seven and nine billion people. And it's going to be us, the leaders in this room, that change that trend.

So that shapes, hopefully, a little context for our discussion around what I believe is ultimately a slide... The last slide here I have is these three numbers I shared back three years ago when I spoke here. It's this simple - and by 2050 we need a hundred percent more food; 70% of that or more has to come from technology. Technology is just doing things better, like the last discussion up here about coal pack to a better farm practice to genetics to a product that may change a trend on an egg productivity level.

Seventy percent is around productivity, and that's really the essence, I think, of this dialog right now over the next 45 minutes is - what entails in that 70%? It's a moral imperative as much as an economic and environmental imperative.

Thank you, Margaret.

Margaret Zeigler

Thank you so much. Okay, so let's dive into this issue of productivity and protein and demand and nutrition. And Bob Thompson, I just want to kind of transition to you a bit now. We remember that about 20 years ago - I think it was about 1999 - Crystal Delgado and Mark Rosegrant at IFPRI wrote a wonderful paper on the coming livestock revolution. And can you talk more about the trends for animal protein and demand globally and give us a bit more of a context?

Robert Thompson

Visiting Scholar, Johns Hopkins University

Yeah, thanks very much, and thanks, Jeff, for that wonderful stage setting for this session.

When we look at demand, as Jeff indicated, we've got to feed something close to the equivalent of two more Chinas in the next 40 years. I think that helps put in perspective the magnitude of the challenge, just in terms of feeding numbers of people. But we've also been in a period of rapid urbanization with half of the world's population living in cities today projected to go to 70% by 2050. We know urbanization changes dietary patterns. It usually includes more animal protein in the diet. And then we've also just come off a period of record rates of poverty reduction over the last 25 years or so in East Asia.

But we see economic growth rates accelerating in South Asia and India and Sub-Saharan Africa. We've got 17 countries that have averaged over 6% economic growth per year for the last decade. We've got 20 countries in Sub-Saharan Africa going to achieve 6% economic growth this year despite the global economic slowdown.

So the first thing that people do when they have additional purchasing power, low-income people do when they have purchasing power, is buy enough calories – solve the basic hunger problem – because in the end, except in times of natural disasters or politically imposed famine – most hunger ultimately is associated with inability to access enough food because they simply lack purchasing power.

So as people first solve the hunger problem, then they have the purchasing power, incomes continue to rise to include animal protein, some eggs, milk, meat, as well as fruits, vegetables and inedible oils. So to the extent that we solve the poverty problem, get incomes rising, we make that important accomplishment of reducing hunger, but then we unleash the period of most rapid increase in demand for agricultural products, as incomes rise from one to two, up to about \$10 or so per day.

So that's the great challenge as well as opportunity. But as we see demand for food increasing by 70 to 80% and including in particular more animal protein in the diet, this means that we've got to figure out how are we going to produce it. If we fail to increase supply as fast as demand, it's going to put upward pressure on prices – we know the poor spend the largest fraction of their incomes on food – and you'll increase the incidence of hunger as a result of the failure to expand supply as fast as demand is growing.

Okay, so what's the potential for expanding supply? Well, first we know that there's at most 10% more land worldwide that isn't presently forested, subject to erosion desertification. So if we need to increase production 70 to 80% or even doubling to satisfy the growing demand for food in the world, and we've only got 10% more land, the only sustainable future is to increase the productivity of that land that's in production. Failure to do that would involve massive destruction of forest. We lose forest, we lose wildlife habitat, we lose biodiversity, reduce carbon sequestration capacity, accelerating global warming - certainly unacceptable environmental outcomes.

So the only sustainable future is one in which we raise productivity in agriculture – first, in the land, certainly also in water. Farmers use 70% of the fresh water used in the world today. If the urban population goes to 70% by 2050, there is no way the world's farmers are going to have access to 70% of the fresh water. So whatever increase in production it's going to take, we're going to have to significantly increase productivity of the water. So if we need to double the average productivity of the land, we may need to triple the crop per drop, and I think it's

extremely appropriate that Professor Hillel was acknowledged at this event for his major contribution to increasing the efficiency of water use in global agriculture.

But it's not only in plant agriculture, as Jeff indicated, where we need to raise productivity. I took Feeds and Feeding at Cornell, the basic animal nutrition course, 50 years ago. The rate of conversion that we learned of how much grain it takes to produce a pound of pork 50 years ago is double what it takes today. We have had major productivity growth in animal agriculture. In dairy farming we're producing almost five times as much milk per cow as we did at the end of World War II and with 80% less feed.

We've had immense productivity growth. But as Jeff indicated, we've got to keep raising productivity in animal agriculture as well as in plant agriculture if we're going to feed the world's larger population better than today at reasonable cost without destroying the environment.

But one other point I want to hit while I have the microphone: It's not only increasing productivity that has to be addressed with urgency. It's also reducing the barriers to international agricultural trade.

East and South Asia have twice as much of the world's population than of the arable land, and virtually all the arable land there is already in production. There is no scenario I can construe in which with population, income growth and urbanization in East and South Asia that they're not going to need more imports from the world market to provide part of their national food security.

Middle East and North Africa of course lack water, along with a number of other dry areas and areas that are getting drier. So when we recognize the mismatch between where the land and the world and the water, fresh water supplies are in the world, with where the population is, we're going to have to have a larger fraction of the world's food production moving through international markets. It's neither economically efficient nor environmentally sustainable to try and be self-sufficient in all food products in every region of the world when you have such a huge mismatch between natural resource base and where the people are.

So we need to reduce the barriers to international trade. We saw in 2008 when a number of countries slammed on the brakes on allowing agricultural exports to occur, this contributed significantly to the overshooting of commodity prices that occurred in the summer of 2008.

So we need to raise productivity, reduce the barriers to international trade, and both of them with urgency.

Margaret Zeigler

Thank you very much, Bob. Enthusiastic audience – this is great. Susan, I want to turn to you next. You know, we talk about macrolevel issues, trade level issues, but what is the impact of increasing productivity, particularly with respect to protein, on nutritional outcomes for women, children, vulnerable populations?

Susan Finn

President & CEO, American Council for Fitness and Education

Well, first of all, thank you, Margaret, for putting the nutrition perspective in this discussion and the role that registered dietitians play in this. There's a lot of us in this country, all over the world, and we're very eager to participate in this kind of a conversation.

I started my career in Cleveland, Ohio, working in the inner city, counseling young, teenage pregnant women. And that was the late sixties, early seventies, and, see, even way back then we knew the importance of prenatal nutrition to the health of the mother, to the health of the child, and the health of the community. We have known this for a long time.

I then went and spent the majority of my career in industry and worked with the Academy of Nutrition and Dietetics, and it is with that background that I want to share a couple of points that I think are really important for the discussion regarding nutrition.

Number one, we know this is a huge, huge global issue, and it's solvable, as many, I'm sure, of your speakers have presented and as Jeff presented. The key is that nutritionists know there are two key periods of life when we need to focus our efforts. One is in pregnancy, and one is in children one to five.

And the reason about pregnancy is nutrition begins right then. It begins in the womb, and every expert in the field of medicine agrees with the fact that that is where we have to lay a good foundation. Something like 17 million stillbirth children born of mothers that simply have inadequate nutrition, and that sets up the whole cascade of illnesses that occur over those years - mental retardation, physical ailments, inability to respond to diseases that normally children would recover from - huge problem.

When you go to children one to five when breastfeeding stops, children are then put on the diet of the culture of the community, and that's where the first thing we see is stunted growth. And while that is an indirect measure of nutritional status, it clearly is a measure that that child is undernourished and not getting enough. And what happens is, of course, we see then that cascade of stunted growth, poor muscle development, poor motor development, and cognition.

And I was saying this morning to Jeff, there's really a very interesting study that I recall from my many years working in industry regarding infant nutrition. And it was work that a well-known pediatrician individual that studied the brain and metabolism of the brain. And he says, "You know, the brain grows, of a child, brain grows on a once-only basis. It grows in-utero, and it grows for the first two years of life. And the nutrients that are needed are needed right then when that process of that brain is developing. You can't catch up. You have to have it then."

And that's why nutritionists, dietitians, really do recommend and urge everybody to focus on that population. That's why we see programs developed to that.

So clearly we've got a problem. I know you have probably dissected the FAO report about 870 million undernourished people around the world, primarily in developing countries. And whether one could argue whether that figure is correct or not, we would agree that it is unacceptably high, and we need to do something about it, and we need to do it now.

So that's point number one. Point number two is that I think we know – and I just came back from the Academy of Nutrition and Dietetics meeting. By the way, our current incoming president is sitting about four rows down, so if you've got any questions, you can ask her. But I just came back from that meeting, and we had 10,000 dietitians there, and there's two things I noticed.

On the agenda and the program this year for the very first time, there was a large number of sessions devoted to world hunger. It's an issue, and it's rising, and our members know that.

Secondly, the number one, when I sat in those sessions, over and over again it was said, yeah, we've got to feed calories, but it's got to be more than calories; just calories aren't enough. It's the quality of those calories that is so important. It's the value of a high-quality diet. We tend to talk about nutrient density. Jeff's example of the egg is a perfect example of a nutrient-dense food. Six grams of protein in one egg – that's half the requirements of a child here in the United States – that's half the protein requirements. Iron – very high in iron, high in choline, which is needed for nerve development. High in xanthine and lutein necessary for eyes. And we could go on and on, and many nutrients we don't even know what they do, that are contained in one egg. We need high-quality proteins.

Now our conversation over the years has kind of shifted. It's clearly calories in the United States we talk about now, over-calories, overconsumption of calories. But clearly our conversations in the scientific community wane between protein fat and carbohydrate. Right now we've kind of short-changed our protein, and we need to get back and talk about it. And it is about animal protein and choices, at least for animal protein.

Why animal protein? Well, we learn in basic chemistry, it's got amino acids, which are necessary for all of our bodies to function, all of our cells to function, including our brains. It's got nine of those essential amino acids that our body can't make. It's absolutely important for cell growth and for muscle and motor development. But because it's nutrient dense, it contains other things that come along with it that are extremely important to health.

It contains zinc. Zinc is found in meat. It is needed for immunity, it is needed for growth. If you open up the basic textbook of any nutrition textbook, it'll show oftentimes what happens in zinc deficiency. You take twins that have been reared differently and fed different diets, and you'll find if it's zinc deficiency, that child does not have the meat, that growth potential. Zinc, very important, found in animal-based foods.

Iron, absorbable form of iron. You know, just because it has iron in it doesn't mean it gets into the body and it's useful. We need a heme source of iron, and that's found in animal protein as well, particularly egg yolk, particularly lean meats.

We also need vitamin A. Vitamin A blindness – 130 million children with various vision deficiencies because of lack of vitamin A. we need vitamin A, and there are many sources to get it. We all think of probably carrots, and clearly yellow, particularly strong orange vegetables and plant-based food have high vitamin A, but so does dairy, and how important it is as well to get along with that particular food group.

B-12 – most of us don't worry about B-12 because we kind of make it in our colon, but we also need B-12 if in fact your diet is really inadequate, and that comes along with meat and milk.

There's a lot of things that come together in animal protein foods that are important, and we need to focus certainly on more protein in the diet. Yes, clearly, combining various plant bases is also an option, but it ought to be a choice that's available for people.

Point number three: We talk about a balanced diet, and no doubt we need to think about all of those components together. And we know that the complexities that you all deal with in the wetlands that you work in are complicated, and it's not just as easy as putting an egg on a table or making a meal with high protein. We know that there are complications, and it takes planning, and it takes all the technology and all the things that you are concerned about at this conference.

But sometimes, sometimes really simple things, little things, can make a big difference. And I would cite for you a study that's probably the most quoted in the literature. It was a study done in Kenya of children that received supplements. They were studying the effect of supplements. And they took 500 and some Kenyan children, and they fed them, and there was a control group, controlled diet, there was a group with a supplement added that was a corn and bean-based supplement. Then we had a group with that same supplement, only milk included, and then a supplement with meat. And it was a very interesting finding, just a supplement five days a week.

What they found over a two-year period was as children grew, they gained weight – no doubt about that, regardless of the supplement they were on; the small things made a difference. But the group that got the meat and the milk gained something else more important. And that was their muscle. The mid-arm muscle circumference, which is an indirect measure of muscle – they were laying down muscle because it was a high-quality protein. How important it is, we provide those kinds of ingredients and food choices.

The other thing is – we saw B-12. B-12 inadequacy went away in the meat and the milk group, and of course cognition improved with the beef group.

So what's all this say to you? It says to me that small things, something as small as that, is doable, it's preventable, and it sets children on the right course of action. And it begins to break that cycle we see of undernourished, underfed, and poorly nourished children. We need to think about breaking that cycle. We need to think about those simple things that we can do to make a real difference in the health of the individual, and the health of a community, and certainly the health of the world.

Thank you.

Margaret Zeigler

Thank you, Susan. Susan, your story there reminds me a bit about just about two and a half years ago I was in Guatemala speaking with a country director of a major nongovernmental organization, and it just sparked my memory of, as he was telling us about the struggle with stunting in Guatemala, and the global problem of stunting is immense, but he shared with me the frustration he had with – How can we get even a cup of milk a day, an egg a day, a cup of milk a day, to a child and the impact that would have. And it is widely recognized that these simple interventions, simple lifestyle changes will really make a dramatic difference.

Susan Finn

It's doable.

Margaret Zeigler

It is. Thank you. Let's turn to Isidro from Honduras. And before actually we get into kind of your presentation, I'd like you to just share a bit more with the audience. Talk about the nature of what you're doing. You have a much larger operation. You're not anyone we'd consider a smallholder farmer. You have a number of operations that you focus on for productivity, different sectors of crop and livestock production. Can you tell us more?

Isidro Ochoa

Farmer & Professor, Zamorano University

Okay. Thank you for the opportunity.

The last 22 years I work at Zamorano Pan-American School of Agriculture, and they encourage us professors there to be involved with the industry. And in that sense I've been a consultant for different farmers, especially beef cattle farmers, dairy farmers, and all the feed crops that support those industries.

At the farm level we work with dairy. We are milking 400 cows, we are growing close to 500 steers, we're doing sugar cane as a main feed crop for them, and we're doing also maize, production of maize in large operation for food and for feed, and we're also doing coffee. We have about a hundred acres right now of coffee, and we're growing in that because of the opportunities.

Margaret Zeigler

A very important group right there, excellent. Well, why don't you talk a bit more from your perspective in Central America, Honduras and many countries in Central America. We'd like to hear a little bit more about perhaps the livelihoods aspect of productivity, the impact that this can have, particularly for women farmers, as they can increase productivity of whatever it is they're growing - crops, livestock, hens. What's the importance of that for women and the health and nutrition of their families and their livelihoods?

Isidro Ochoa

In Latin America we don't see as much participation of women as I experience here in the dialogues, in Africa, for example. But anyway, the women that are involved in the animal industry, it doesn't matter if they are producing eggs or they are producing milk, it provides a cash flow for them. It provides an opportunity for them to get involved into an industry that it has a good cash flow, a daily cash flow. And that enables them and empowers them to feed their families, to become active in their economies.

It is known that when you move one dollar in the milk industry, you're usually moving anywhere from two to three dollars in a side business and in other industries that are related to

the community. So if women can get involved in such operations, they have a greater opportunity than just food crops, just as they get involved in high cash crops also. If they get involved in an industry like milk production or egg production, where there's a cash flow, then they will have better opportunities.

Margaret Zeigler

Great, great. Well, why don't you share a bit more with some of the practices in the region that you see that are contributing to productivity from your experience in Central America. What are some of the promising innovations, whether it's on the science side, whether it's on management practices, feed practices, marketing practices. What are some of the ways that productivity is really helping farmers in Central America.

Isidro Ochoa

I just want to start by referring to a small study. Most farmers, when we have been asked to produce more, to produce a hundred tons of a certain food, usually in the past and right now we are delivering 110, 120, and that's thanks to the tools such as Dr. Norman Borlaug with those hybrids and also by technology.

The study that I have to share with you from Honduras, we were hit with Hurricane Mitch 14 years ago, almost to the day, because it was October 31st. And the quickest industry that responded and was able to put economic flow in the communities was the dairy industry. We then, together with USAID and Land O'Lakes, we put together a program where we developed 40 milk collection and cooling centers in order for them to get access to a better market.

The production baseline was 23 producers for each center, and it was 1100 liters of milk for all of them as an average, not even 50, around 50 liters per producer. We scaled down on the facilities that they have, and now 14 years past, they're producing, the least amount is 8,000 liters. Some of them are producing 12,000 liters. So given the opportunity, if producers are given the opportunity, they will deliver more food and more economic growth for their communities, if given the proper opportunities.

We came together with best management practices with pasture-based production management practices. We came together with better health practices and with feeding programs. And as a result of that, we didn't think that they would grow to 5,000 liters because we built the centers for them to handle 5,000 liters, and they are handling now, most of them are having to rebuild their centers because they are delivering 8,000, 9,000, 12,000 liters.

So in that sense, for us to be more productive in the next 30 years, the GAP report says that Latin America will be the next supporter of food. And then what we need is the opportunities to be able to produce that.

However, as opposed to the last 30 years, we now have such constraints – we have water constraints, we have higher feed costs, we have a lot of biotic, it seems against us. And we need biotechnology. We need the opportunities that biotechnology has. And if you can put a slide that I have... I am using, for example, in order to produce more milk, we need better pregnancy rates in our cows. And we are, through technology to do the hormone schemes to handle extra cycle, we are able to get 80 better percent of pregnancy rates. We are using the genetics both

from Brazil, milking yield, and from the United States or New Zealand, with the years of technology, with the Jersey breeds and the Freisian or Holstein breeds, and we are putting together a cross-breed cow that is able to produce much better under our tropical conditions.

We need the vaccines. We need a lot of things that are provided in the animal health industry, just like Jeff mentioned, that enable us to produce 10, 15, 20% more milk or more beef. And also, where the biggest impact that the biotechnology has is in the animal feed and nutrition industry. We need the enzymes, we need the prebiotics, we need the probiotics, in order for us to achieve greater standards of production, greater effectiveness of production, greater conversion rates, and to deliver better milk or beef or whatever we are producing.

I think biotechnology has a role and is playing a role already, but we cannot be denied the opportunities that biotechnology has to offer, and we cannot just ignore those opportunities that biotechnology has to offer, in order to become more effective and to get that 70% that you have mentioned out of... that 70% extra production needs to come out of not only better management but also biotechnology.

Margaret Zeigler

And just a follow-up question I wanted to ask. I'm curious about how you see, Isidro, this interaction between increased productivity and the potential for improved sustainability on the environment, protection of resources. What's the interaction there?

Isidro Ochoa

In order to have access for us, even in national markets, we are now having to be certified, and all these certification processes, one of the things they are looking to us for is for environmental issues. We need to be able to produce in an environmentally responsible manner. We need to be producing in a socially responsible manner.

We were not asked for a long time, that even though I think farmers were doing as much as possible, as much as they could, but now in order to get access to market nationally or internationally, it doesn't matter if it is a staple food like milk, for example, the companies that buy our milk are asking us to be environmentally responsible. It doesn't matter if you are producing staple foods - rice or corn - they have certain standards, and we need to comply with that. And in the international market it is even, we are not with the... but we have to comply with a lot of laws, with a lot of biohazards, with a lot of things in order to get access to European markets, to United States markets, or to Middle East markets. We are sending beef to Middle East markets now, and we are having to comply with a lot of certification processes that are needed and that we are looking at after.

Margaret Zeigler

Great, excellent examples, thank you. I wanted also just to touch a bit on perhaps bringing things back around to you, Jeff. I know that you talk a lot, and the theme of this whole week has been partnerships. What are some effective partnerships that you can share that you've seen from your work at Elanco with either developing country governments, with other partners, civil society organizations? Can you share a little bit more about this theme of partnerships and what you see as successful models?

Jeff Simmons

Yeah, I think it is absolutely critical that we really understand the facts and give every country the opportunity to capitalize on the opportunity. So I say – we’re here in America – it’s a good place to start to say, back to the earlier question – in the last 55 years we have increased food 250% on the same carbon footprint. When anyone ever asks me, “Give me a great technology,” I say, “I could go to Brazil, I could go even to Europe. Let’s start with American agriculture.” 250%? Same carbon footprint? Give me any industry that could touch that.

Now the challenge is – we’ve got to do it again. And we not just do it again here, we’ve got to do it again in Kenya, and we’ve got to do it in Southern China. And so to me I think, one, it’s globalizing technology. It’s companies and countries like ourselves and others being able to take plants, animal, many technologies, cold storage, and get in there and understand the importance of it.

Technology can’t be disconnected with bad with food. It is the answer to every other industry. It’s the answer to this industry. We’ve never raised it more efficiently, it’s never been more safe than it is, and bring on the food standards – raise ‘em – because I believe that looking at the pipelines of technology today, just as Norman Borlaug said, we’ve got enough technology in our pipelines and enough technology around the world to feed ten billion people. But it’s globalizing it, it’s taking it local, and I think it’s trade standards.

I think trade standards is another way we must collaborate. The FAO, the Codex-type organizations that say – look, every country can decide whether or not, what they want to accept, but allow the 200 and some countries that are involved in that to be able to say – “Okay, thank you for that standard, that residue standard or whatever – now I know it’s safe.” Or, that animal practice is the ideal practice. I think knowing that allows there to be less politics, that allows to be at least a level playing field and allows countries, companies, the private, the public, and the social – that kind of triangle – to be able to go in there locally and say – Okay, now let’s talk about it.

I was in a country in Latin America last week, and they defined a gap – this I think is the future of food. And they said by 2020 here’s our gap. And then they split it up by the proteins they want and the different segments – how much grain gap, how much beef gap, how much.... And then they had companies like us and other organizations sitting at the table, saying - What can you do to fill that gap? That’s the future. And we can do this – as Norman Borlaug said – we can do this. It’s just having that, allowing to have that dialogue and not allowing some minority voice with a different objective to blurry what is the important part of this vision.

Margaret Zeigler

Thank you, Jeff. I think we have about two to three minutes here for a few questions before we wrap up. So if anyone in the audience has two questions to have a little bit of interaction with our panel, I believe there’s a microphone in the center aisle.

Q Sorry – this microphone wasn’t set up for the... demographic in the audience.

Zeigler If you could say your name and who you’re with.

Q Yes, I'm Nabeeha Kazi with Humanitas Global in Washington, DC. Thank you for this fantastic panel and for this information. I think it's loud and clear that we really need to leverage innovation and resources to meet growing global food demands. And I think we all know, and something to recognize, that just because we meet global food demands does not necessarily mean that we're also going to meet global nutrition demands. That's an opportunity and a challenge for us, and I think we have to be quite deliberate to address both. So my question for you - I'm putting my public health hat on, and I'm also asking the question recognizing that, despite raising incomes and economic status in emerging countries, we still may be short on dietary diversity. We still may have issues because there isn't rampant fortification, for example. So my question is - What's currently underway, and what is the untapped potential to improve the nutritional profile and value of animal-sourced outputs? So how do we really get that nutrition bang for our buck out of that one egg or that piece of meat? I'd love to hear your comments.

Finn Do you want to stop and then I'll... Well, obviously, Nabeeha, is you've got to get those foods to these people. I mean, clearly animal source proteins are the best sources for many of the micronutrients that are missing in the diets of children and pregnant women and others in low-end poverty-stricken areas. We have to do a better job of including those protein foods. And as I said, I think what we've done is we've focused, particularly in the United States, on calories, not on protein. We've focused on fat, not on protein. It's about getting all of those things. And if you really look at the protein needs of an individual, they're about 10 to 15% of those calories, maybe a little higher, depending on the individual. So it's relatively a small amount of the total calories that need to be focused on, on protein foods, particularly animal protein foods... Technology is a huge part of this, and of course this is what this whole debate is, about GMOs and other initiatives, is really improving the existing qualities of those foods, so that they meet the specific needs of that population.

Q Yeah, I mean, and I know we've got another question here, but we're seeing this in the cross-space of biofortification, and we know that we're just scratching the surface with improving omega-3 profile of eggs. So what else could we be doing? What's not happening that's on the horizon?

Zeigler Thank you. Bob wants to say something.

Thompson I'd just like to add one point related to this, not from the technology side but from the public policy side. In most countries of the world which have price supports for agricultural commodities, we're supporting the prices of staples. We're not doing anything to encourage the production of nutrient-dense foods - fruits, vegetables, even animal protein other than milk, which tends to be supported in many countries. And we could do a better job of providing the right signals to farmers to produce those nutrient-dense crops in countries throughout the developing world as well as in the high-income countries.

And then I think, you know, farmers respond to price incentives, inclusive of public policy, and I think that would help address the issue you raise as well. So we need both public policy and technology, and education, of course.

Zeigler Okay. One more question.

Q I'm Mary from Kenya... And I want to contribute by talking about something... our future thoughts, and it leads back to food and nutrition security. Looking at the situation of cooking energy – and looking at the situations in our developing countries. Poor households spend a lot of money on cooking energy, and if that trend continues and we are able to increase production, we might end up in a situation where we have more households having food but then going hungry because they cannot be able to cook their food. And looking at the situation in nondeveloping countries, for example, in Kenya – if you are living on that dollar per day and then you have to use all this money on purchasing energy, then energy poverty...

Zeigler Excuse me. I'm sorry, I'm sorry to interrupt. Could you just ask the question, please, because we don't want to take time away from the next panel.

Q Yes, that's okay. What I'm saying is that we need to include energy in the debate, because we need to look at energy poverty is not only going to cause people to be hungry, but they're also going to be depressed. They have food that they cannot cook.

Zeigler Thank you, thank you. It's a great point, and if any of you want to... Do you want to address quickly her issue, any one of you?

Thomson The only thing I would add to that is, you know, we have terribly inefficient cooking technologies in the food preparation place in homes throughout the developing world. There's a lot that can be gained by increasing the efficiency of the use of the energy that we do use. Also, probably the greatest cost, though, is not in the inability to cook, it's the amount time the young girls spend fetching fuel wood and other fuels for that cooking function, and as a result they end up not being in school but rather spend their days fetching fuel wood as well as water.

Zeigler Thank you. I'm going to ask Jeff now to just make some closing remarks for us before we close this panel. So, Jeff, final thoughts. And thank you, all of the panelists, for your input.

? [inaudible]

Simmons Well, I'll get to that, okay, in my closing comments here.

? Are those free-range eggs?

Simmons No, they're not free-range eggs... You know, I'll conclude by saying thank you to this panel. It's an honor to sit here with such a diverse and such an experienced

panel. And thank you, Margaret, for leading us in this discussion. I guess I would conclude by just saying a couple things.

I think we link back a lot to these three things: This safe, abundant, affordable food and food security. Through my lens of listening and a lot of talks and a lot of dialogue, like all of you – innovation or technology, whatever you call it – we've got to do it better. We've got to do it better.

Two is choice. Choice is important. Maybe it links to the free-range eggs, is – we need to let everybody choose. There's vegetarians in this audience that have heard about animal-based protein, and I've got a vegetarian that runs all of our manufacturing and half our employees. I believe in choice. We all should believe in choice, whether it's at a country level or a consumer level, or that teenage daughter level. Choice matters. (I have two of 'em – it's my biggest leadership challenge right now is my two teenage daughters.)

Choice matters, but when choice becomes your choice and your beliefs are so strong that suddenly you no longer have regulator, you have a minority voice that suddenly becomes the new regulator, we have a problem. Then we start to get what Norman Borlaug says is immoral and wrong.

And third, I think, is trade, is globalization. We need to take technology globally. We need to execute it on the ground better, whether that's cooking technology or whether that's a new product or a new practice. We need to let meat, milk, eggs, grains move around the world – that's the only way to fully solve between seven and nine billion people.

But I end with this – I ask all of you. I never ever end an audience – I'm sorry – but I'll come back to maybe this. I don't want you to look at an egg differently. What I ask every single employee in my company is: Every single quarter, every month if you can – we give them a half a day – go out and see a hungry face. Because when that happens, I believe what I said at the G8 is – the hunger inside of us – I don't care if you're a politician, a farmer, a dietitian, wherever you stand on these issues – we've got to get out of our bubble. Because most of us live in a bubble. The hunger inside of us wanting to become a part of something bigger is the solution to the physical hunger that this thing is all about. That's what Norman Borlaug had that I believe we need.

And when that happens, things change. I've seen things change. I've lost control of my company, because when people see this, it's suddenly, it's about a cause. And this is truly what our cause is. I've been just... I'm in the middle of a month-long hunger challenge. And I've got my six kids, myself, my wife, eating rice and beans like half the world, all week. And I'm going to interview them. If you want to follow me on Twitter, I'm going to interview them tonight. And they aren't very happy about the rice and beans, okay. What they don't realize is week number two, we're going on a food stamp budget, and we're all leaving on \$4.18 a day.

My challenge is – When we get outside of our bubble, things change. Don't leave the World Food Prize 2012 without getting out of your bubble, because I'm telling you,

with the intellect in this room, we light our fire more like Norman Borlaug – things will change. And we will unfold this ag story over the next few months. If you want to follow along in social media, we're going to tell more and more about this. Because I think it takes these kind of examples.

Thank you. Thank you for who you are, what you do.

Zeigler Ken.

Ambassador Quinn

Well, I'm glad I made it back from seeing off the Secretary-General to hear the end of the panel and to hear you, Jeff. That was very powerful, very powerful.