

2014 BORLAUG DIALOGUE

October 15, 2014 - 2:15 p.m.

Panel: *Sir Gordon Conway, Moderator*

Introduction:

Ambassador Kenneth M. Quinn

President - World Food Prize Foundation

So now for the next part of The Borlaug Report. Sir Gordon Conway has put together a terrific panel. They're going to come up here, and I'm going to turn this over to him, and we're going to hear the response, analysis and other views. Gordon.

PANEL:

THE BORLAUG REPORT:

CRITICAL FACTORS IN MEETING THE GREATEST CHALLENGE

Panel Moderator:

Sir Gordon Conway

Professor of International Development, Imperial College London

Panel Members:

Dr. Shenggen Fan Director General, International Food Policy Research Institute

Dr. Leo Abruzzese Global Forecasting Director and Director of Public Policy, Economist Intelligence Unit

Dr. Margaret Zeigler Executive Director, Global Harvest Initiative

Marc Sadler Adviser on Risk and Markets, Agriculture Global Practice, The World Bank

Sir Gordon Conway

If I can get you to settle down... I know you will want to go out and run around the town, but this is more important.

I'm Gordon Conway from Imperial College. I know that there's some of you in the audience who remember the great celebration we had for Norm Borlaug's birthday in Ciudad Obregon, and they've been coming to me and saying, "Your panel's got to be like that. It's got to be fun.

We've got to have music and dancing and so on." Well, I'm afraid not. This whole thing is far too serious for that, so this is a serious discussion we're going to have now.

We're surrounded by crises of all kinds – water crisis, food crisis, and energy crisis, the financial crisis, the climate change crisis, civil strife – and the thing about all these crises is they're getting worse, and they're getting greater interconnected. That's the world we live in right now, and very few people can understand all that's going on in the world. I don't think, in fact, anybody can in terms of these crises. Being human beings, we've got to pick off one, and today we've picked off the food crisis. And we want to pick up from what Ken's done for us, and I'm really delighted with what he's come up with; we're going to discuss that.

Now, I've got a great team here. I've got Margaret Zeigler over there, who is the Executive Director of Harvest International – I've got that wrong – Global Harvest Initiative, but it is international; it's a private sector group. Next to her, Marc Sadler, who is the Adviser on Risk and Markets in The World Bank. Next to him is Leo Abruzzese, who is the Director of both Global Forecasting and Public Policy, the Economist Intelligence Unit. And, finally, Shenggen Fan here, who is the Director General of IFPRI, the International Food Policy Research Institute. So we've got a lot of firepower. We've got a lot of people who've got a lot of intellectual and analytical understanding of the issues around food security.

I'm going to start by asking each of them just to say some headlines, one or two minutes of headlines, and then we're going to go through a number of different subjects, with each of them coming in, and get some kind of argument going, I hope, in places. We're going to run for 45 minutes, and then we're going to have questions and answers – we're going to keep our hour, right? There you are. Okay. That's like my exercise bike.

So Shenggen, why don't you start off with just some key headlines before we move into our other things.

Shenggen Fan

Good afternoon, everybody. So I very much agree with the Cassman report on the challenges we are going to face – water and land, climate change, and the declining growth rate in crop productivity. However, don't forget that for the last several decades we have achieved a lot in terms of promoting total factor productivity, not just man productivity. So we have produced more with less. So don't forget we have very tremendous progress on that.

Secondly, some of the productivity presented by Ken is on crop. The growth rates of non-crop food have been much faster than crops – livestock, fishery, vegetables, fruits. So nutrition – we have seen tremendous improvement in nutrition. Don't forget about that part.

Now, we should also not forget about innovations in other areas, in addition to technologies. I know many speakers and the next panel will discuss about technological innovations. Here I wanted to emphasize the role of the innovations, the institutions, markets, policies. Markets – people will respond to markets; if the price is too high, they would adjust their consumption pattern. If there is incentive to invest more, then the people will respond to that. I will come back to some of the more detailed elaborate issues on the innovations, the institutions, markets and the policies.

Sir Gordon Conway

Okay, these are tasters. Leo, some tasters.

Leo Abruzzese

All right. I work for the Economist Intelligence Unit, emphasis on the word, “Economist.” So when we think about food security, we usually start by thinking of the macro economy. So I’ll give you two headlines. Two things are going to happen this month globally that represent, I would say, epic milestones.

One is – sometime this month China will surpass the United States as the largest economy in the world measured in purchasing power terms. This is significant for a couple of reasons. This is the culmination of 25 years of the rise of emerging markets. And it has been that rise in emerging markets that’s one of the reasons why we’ve seen food prices start to rise in the last decade after going down for 20 years.

But here’s something provocative – Gordon, you said to be provocative. China is not going to stop growing. We still have plenty of other countries that have to rise to that level, but China is in a class by itself. And I would submit to you that, while all of the figures we’ve seen on the nine billion people and the demands for food will increase, they may not increase and the demands may not be quite as severe as we’ve said, because I don’t think there’s another China out there – and I would not put India in that class. So you want something provocative? Yes, there’s going to be pressures, but what we’ve seen in China is not going to be repeated. China is in a class by itself, number one.

Number two: I said there were two things that were happening this month. The other one would seem to have nothing to do with food, but it says something about innovation, the point that Shenggen made. Probably this week the United States will surpass Saudi Arabia as the biggest petroleum producer in the world. Had you said that to anyone seven or eight years ago, they would have laughed you out of the room. It changed because of what Ken mentioned earlier, and that is technology: horizontal drilling and hydraulic fracturing. There are certainly environmental issues with those, so we can leave those aside for a moment. But if the right technology and the right economic incentives are in place, that investment can make a huge difference in innovation and completely change the landscape in a short period of time. That’s probably not going to happen in agriculture, but if you minimize the potential impact of innovation, then you’ll miss out completely what everyone missed ten years ago – wind energy.

Sir Gordon Conway

Right. Well, we’ll come back to those. Marc.

Marc Sadler

You said you wanted to spark debate, and two words really came out earlier on. One was all about roads, and the other one was the question – are we on the right course? So it gave me three questions.

Well, do we actually know where we're going? We've had some serious structural shifts in demand that are really being driven by income; they're not totally being driven by population. And income is the key. And if we are successful, if I'm good at my day job, that means that the profile of demand is going to change dramatically, much more than we've seen.

So what's the map? Do we know how to get there? Well, I'd argue that, no, we don't, because the map that we've been following doesn't look the same anymore. Climate change is going to fundamentally alter the way that we manage landscapes; because, if we don't, we will not be able to feed the planet.

And the third thing was—How are we going to get there? Is it the same car that we've been using? And the answer is, no, it can't be. We cannot carry on managing landscapes the way that we've been. And just the one factor there that, if we agree that a two-degree world, we can emit no more than 21, 22 gigatons in 2050, if we carry on business-as-usual agriculture, that will actually account for 70% of that number, will be the biggest emitters on the planet, much bigger than all the other sectors combined.

So I think we've got some real thinking to do and some real answers to put on the table.

Sir Gordon Conway

Margaret.

Margaret Zeigler

Well, thank you again for inviting me today to be part of this panel, and congratulations to Ken for the Inaugural Borlaug Report. And I want to say that Global Harvest Initiative, our recently released this morning GAP Report definitely concurs with some of your findings and the trend analysis you're doing. We are seeing decade after decade a falloff in the productivity growth rates that are required to really double output by 2050, primarily in developed countries. What we are seeing in developing countries is productivity is growing as a share of agricultural output, but we are also seeing that massive expansion into land; and that is definitely a trend that we've been seeing, and that concurs with our findings and your findings as well.

Farming smarter and with greater precision, I think, is going to be the future of farming. And that's going to look different in different parts of the world. Here in North America it's going to be a very intelligent tractor, combine, using precision data analysis, soil sampling, variable rate application of water, fertilizer, seeds, etc. In India, it may involve just being able to dial a call center and have customized, tailored information provided to you based on a soil sample that was taken by an extension agent as part of a package of services.

So I think that we have to wrap our heads around, where are those innovation technologies? What are the revolutions coming for precision agriculture? What will it look like in all parts of the world? And really push for that. And a big part of that is access to data, of course.

I think also—you know, when you mentioned the rise of India and China, of course, and this reinforces in many ways that we've been missing a lot about the role of trade; because the role of trade in supplying food to these regions that are going to have this incredible demand—a

billion people coming into the middle class in India, almost a billion in China, other parts of the world also rising – so we're going to need to consider trade as really part of the big tool, not just for the movement of food but for the movement of technology, innovation and other such inputs and services. So we have to think about trade facilitation and how that might help smallholder farmers partake in local, regional and global markets.

Conway Okay. Well, I want to come back to you later on both trade and also on the precision farming. And, Marc, when we talk about that, you might want to say whether precision farming is a kind of game-changer technology or not.

But let's start by trying to decide just how bleak Ken's forecast is, or what he comes up with. Is it as gloomy as all that? I've got a sense you don't think it's as bad as he portrays it, Shenggen. Is that right?

Fan Well, I think we are facing some challenges, but all these challenges can be tackled, can be solved through different innovations. In our next session under Professor Swaminathan's moderation, they will discuss about where is innovations, particularly in the innovations, to promote so-called "sustainable intensification." What I really mean here is to produce more with less, produce more – more means more nutrition, not just more grains – more nutrition with less, less water, less energy, less land, less carbon emission. But can we achieve this? Technology, CGIS research, let's say IRRI, CIMMYT, certain varieties can produce 30% more yields with very efficient use of water, very efficient use of energy, and reduce carbon emission by 20-30%. IFPRI's program of biofortification to add micronutrients to the same food crops so you have more nutrition through breeding, whether it is a traditional or modern breeding, to produce more with less.

Policy innovations – I think right now where we mention about China, I don't think China has a problem of food security. It has a problem of food policy. They're messed up with the policy problem, policy issue – overly subsidization of fertilizers, water leads to overuse of these inputs, so the efficient use of these inputs – underground water pollution, food safety issues. In the meantime, 30% of the food is wasted. And obesity has become a serious issue right now. So from the demand side, consumption side, how can we change certain policies to make sure that their consumption is sustainable? Proper pricing is so critical, proper pricing. Prices should be taken into conservation of the environmental impact, carbon emission impact, health impact. So if we integrate all of this externalities into pricing, the prices probably will be higher; farmers will have no incentive to produce more because the food prices are higher. Farmers will respond to that. In the meantime, the poorest of poor who do not have access to food, do not have access to income, and the social protection system will kick in, so very targeted social protection.

Conway Well, this sounds like a system that's all going to work. If you define... You talked about sustainable intensification, and others have mentioned that. If you do sustainable intensification, you've got to increase yields on the same amount of land, you've got to reduce the amount of inputs of pesticides and fertilizers, you've got to increase natural capital, such as water-retaining soils, you've got to reduce

greenhouse gas emissions, and you've got to make it more resilient. That's a tall order – and you think we can do that? I know you can do individual bits of that, but to do all of that?

Fan As I said, technologies will play a huge role there, but in the meantime, policies. So policies will guide consumers and the producers to make the best choice. So the consumers will choose a food that is more sustainable, more healthy, nutritious; and the producers will be able to produce more with less through changing the practice crop mix. Here I want to emphasize – let's not just think about rice with maize. Think more about fruits, vegetables, livestock, meat, meat. Jimmy Smith is sitting here. Meat, livestock is so critical. Fish – all of these are very important. So not just rice with maize.

For your information, the per capita consumption of rice in China has come down? Why do we have to focus on rice? Well, I think it's still important, but the people are eating less rice, eating less bread. Well, they do use more maize; that's because they eat more meat. Meat is produced by using more maize and soybean.

Conway Margaret, your GAP Report, which is a great report, and I recommend people to... It's available now, right, on the Web? It's a tremendous report. It's great because it's beautifully written and illustrated. It's one of the best reports for actually assimilating. Are you as optimistic as Shenggen, based on your GAP reports?

Zeigler I would say I'm a little bit more concerned, not so much because we don't have the technologies and the practices that exist. It's going to be ensuring that we extend those technologies and practices in the places where it's needed most across the planet – because we can't ignore places; we can't ignore parts of the world. And I really think that this attention to this issue is still not rising up to the level that we need to get it to.

We are competing right now with so many other factors on the earth, and it's in some ways a bit of a slow-onset disaster. You know, in 2009 we had a food price crisis, and the world was focused. And I'm sensing in many ways that the attention has trailed off a bit. And so I really think that all of us, we need to continue to be committed; we need to bring in new voices from outside of our regular, our usual suspects and keep including more and more voices in this very important mission.

I am mostly optimistic, though, because in our GAP Report we just looked at India, and we are seeing some great innovations that technology is taking place there. And I'm cautiously optimistic with the election of the new government in India that there are going to be some changes put in place that will help with the productivity of agriculture and can serve as a really great model for other countries that are developing.

Conway Marc, you're more pessimistic, right? I mean, you think there are structural changes going on there that are really tough to handle.

Sadler So going back to the old private sector days – where there is a challenge, there is an opportunity. So I think we really are approaching a tipping point, a tipping point that will require both political will but also a cognizance of the problem that we actually really face as a planet in the food system. So that means we have to identify that the incremental change will not get us where we need to go. And I do not believe that incremental change will solve our problems anymore.

Having decided that, I think there are fantastic opportunities, but I think we really need to focus in. We're talking about systemic change, and I think we have to focus on that. And we have to really identify what are the drivers within the system? Where are the leverage points?

And for me especially there are a couple of really clear ones that are out there. At the food retail level globally, it's a \$5.4 trillion-dollar industry. It sounds like a really big number, but in actual fact the foreign exchange markets turn over \$4 trillion a day. But this is what feeds us. But the total retail level, when you take into account restaurants, is \$15 trillion. OECD BRIC subsidies to agriculture now account for about \$430 billion dollars. So where, who is going to drive this change? And arguably, the private sector has to take the lead here. That's thing.

The other thing is – we're not dealing with a closed system that produces widgets using robots. At the very core of everything – every change that we seek to make and have to do – like farmers, the people who manage landscapes (and that means foresters and fishers), we have to get into that piece. And that piece is not so much, to me anyway, necessarily about technology; it's about behavioral change, and it's about incentives.

We can go and say to people, "This is good for you, and you should do it." I now use a very simple mantra. Fortunately, in my day job I have to spend a lot of time standing in villages in front of farmers who are like, yeah whatever. And unless you can explain to someone how they're going to make money, save money or save time, you better come up with a different way of explaining to them why they should do what they need to do. And I feel, as a community, that we're not very good at that – this makes sense, it's good for the planet, these sorts of things. We have to deal with the behavioral issues that lie underneath, and that comes down to incentives.

And that comes down to the point that was made earlier – let's treat farmers as business people. Let's talk about the economic opportunities, let's talk about the incomes, and let's talk about what it really means to their families to deliver on this.

Conway Leo, do you want to come into what's just been said?

Abruzzese Yeah. Well, a couple things going on there. I would say I think I agree a bit more with Shenggen and that I'm a bit more optimistic, and I would say for a couple of reasons.

And this is a bit simplistic, but going back to what you said earlier, there are four or five things that we know we need to do in order to be able to feed the nine billion people by 2050. They've been discussed right now, but let's sort of tick them off.

If you can start to close the yield gaps in a number of places – that's sort of number one.

Number two, Margaret talked about the precision farming, which I think to a certain extent is driven by data. I work in the private sector. Big data has revolutionized one industry after another. It's barely made an impact at all on agriculture right now. So that would be number two.

Shenggen talked about diets. You know the figure – what is it, 55% of all the food that's produced doesn't even get into people's stomachs, because it's being used for biofuel and other things as well too. And meat is not necessarily the answer for everything. If you can make some diet changes, that helps you to get there as well. And what's the waste figure right now? 25% of all calories are wasted; 50% of the volume of food is wasted.

I mean, each of those things could take decades to get there, but nonetheless we know what we have to do. And I'm a big proponent of the technology.

If you go back 20 years ago, there was a time in the early nineties, everyone was waiting for poor countries to get landline telephones, so that they could then move into the 20 or 21st century. Who cares about that anymore right now? The perspective on this can change in 10 or 15 years because of technology.

Fan In 2007, 2008 we experienced a rapid food price increase, and partly because of long-term investment in agriculture. But equally important is a policy problem. When the prices begin to move up, many countries begin to use trade bans. In the case of rice, there was no shortage of rice production; India, China was sitting with a large amount of rice. But, because of fear, fear of the domestic prices would go up, so they began to impose export bans. The rice prices doubled and tripled within six months to a year. So don't forget the policy is a problem. It could also be a solution.

Conway Yes, go on.

Abruzzese I was just going to say, Margaret pointed out, though – we had those food price spikes in 2008, 2011. This is a short-term issue. But right now we do projections on food prices for wheat and soybean – prices are going down for the next four or five years. We are right now, temporarily (and you want provocative), we're in an age... I shouldn't say an age. We're in a period of agricultural plenty. Prices are going to go down 6 or 7% this year.

Conway But that may not... you know, there will be other big crises. And the one thing that we haven't talked about, and Ken didn't really get into, was the, what's changed

with the emerging countries was greater incomes and the shift in those countries—for example, in China and Korea and India and Nigeria and Brazil—towards more livestock diets. People in those countries are eating more like we do in this room. They're eating milk, of course, they're eating eggs, they're eating butter, they're eating chickens, they're eating pork, they're eating beef.

China consumes half of all the pork and related meats that are made in the world—half of all the pig meat in the world is consumed in China. And that's why China has bought up Smithfield. That's why China is importing a very high proportion of the soybeans on the market. And that demand is enormous because of the feed grains that we're going to have to provide for those animals, whatever it is—you know, there's all kinds of figures float around, and it varies—ten pounds of grain for one pound of meat, or something of that nature. That's a huge demand. If it was only the population that we were going to support, the increase in population, just the number of extra mouths eating what they've been eating before, that's easy. But producing the extra grain is going to be more difficult.

And the problem, it seems to me—this is my chance to say things like that—I realize I'm with a whole bunch of economists here. (Yeah, congratulations, Shenggen.) If we have another crisis like we had in 2010 with the drought in the United States, the heat wave in Russia, the flooding in Pakistan, the flooding in Eastern China and the drought in Southeast Australia, all coming together, threatening supplies, for example, of soybean for China, China is going to go out on the market and get what it can in terms of soybean. And it's going to be a major crisis.

And it seems to me, even though prices are going down at the moment and so on, these big crises are going to get worse—aren't they, or not?

Sadler Can I?

Conway You, yeah, you can. Yeah, go ahead.

Sadler I'm to an economist either, but I'm an ex-markets guy. I remember the conversation in 2012. One of the biggest food companies in this country was discussing at their board level whether or not they'd buy corn options. Corn options at the time were trading at literally no money at all. Five weeks later they were scrambling to buy corn. And what happened? And don't think that 2012 was about a drought in the U.S. It was about seven days and overnight temperatures—that's what killed the corn crop, not the drought. We could have had lots of rain; it would have not come back to the yield. We may have made another 20, 30 bushels. But the real damage was done at that time. That company's share price tanked—and I can even show you that graph—because the market knew exactly that they were totally and utterly exposed.

And, you know, the climate people tend to talk about “extreme weather events,” but agriculture doesn't live in extremes; cities live in extremes—inundation, flood, earthquakes. Agriculture doesn't. We're at the tipping point. We're at that frontier

every day, especially with crops like corn. La roya , which wiped out over 30% of the coffee crop in Central America for some of the poorest people in those countries was caused by what? It was caused by a fungus. Why did that fungus explode? Because it was slightly warmer, and it was slightly damper. And if you even talk to a farmer and said, “Did you notice that extreme event?” The answer is, “Of course not. What the heck are you talking about?” What they saw was extreme impacts. Climate change in agriculture is about impact; it’s not about event.

And more and more as we move up our marginal lands... Let’s look at the supply response in the U.S. we moved up to 97 million acres last year of corn in the U.S. Some of those acres are pulling in almost 300 bushels – this is prime corn land. But the average is going to be down somewhere in the 170s, 180s. What that means is that that expansion was into lands that were highly marginal. There were good reasons why we weren’t farming that. And why are we now down to 91 million acres? Because of the price.

And the big problem that we’ve got here is – we used to call it potatoes and pork markets, but now it’s pretty much for everything. So the supply response linked to the price. Prices of corn is now down to sort of early threes, three bucks, twenty. Guess what? You lost six million acres overnight, literally. And this is going to continually happen.

So making projections in the face of climate change when we’re dealing with a production that’s right at the frontier is really difficult. What we know is volatility is here to stay, and over the long term the viability of our landscapes and the way that we manage them is seriously under threat.

Abruzzese The volatility has always been there, right? I mean, it’s commodities markets. The volatility is there every several years – no?

Sadler Yeah, I love the... Yeah, so I deal with a lot of macro-economists in the bank who love to tell me that volatility has been around for a long time. The volatility that affects markets, the volatility that affects finance, and the volatility that affects farmers is the intraday volatility. Those volatilities were much higher for the five-, six-year period than they had been in any intervening period in the previous three decades – that’s the volatility. It’s not what the price was at the beginning... I remember having a conversation where I was told the volatilities had come down, and someone had taken a price series of what June was and what December was. And the price was pretty much the same, so volatility’s gone. The price did this – that’s what impacts markets, farmers and this business.

Conway Okay, great. Let’s move to technology. Shenggen, you’ve got a sort of technology toolkit you’ve produced, right? Could you just say something quickly about that, because that’s part of your optimism, right?

Fan Well, I don’t have a technology toolkit, but Mark Rosegrant probably will introduce this toolkit in the next session. Yes, there are many, many kinds of technologies that can be used to produce more with less, so this is called

sustainable intensification technologies. What we need to do is to make sure that these technologies should have enabling environment to be further developed for it to be used.

For example, I was in Bangladesh just about seven days ago. The country introduced a beautiful technology called a “BT brinjal” (you might know the BT eggplant) that can reduce the use of pesticides, reduce the cost. And Bangladesh was the first country in South Asia to commercialize any food GMO crops technologies. But we were interviewed by the media.

Conway Do you think China is going to introduce commercial GM crops on a big scale in the next five years?

Fan I think... Well, there are some great potentials. They have used BT cottons. They have some research achievements.

Conway They’ve also got a lot of BT corn out there, too.

Fan Yeah, BT corn, BT rice, but the question is whether these BT crops, or GM crops, will be move to commercialization? So in every environment the biosafety regulations have to be set up to make sure these good technologies can be used.

Conway Okay, but there are technologies there.

Fan Yes, we can always analyze that now these technology can mature.

Conway Margaret, you’ve got examples that you put in the report of new technologies that are exciting.

Zeigler Right, and I would just...

Conway Can you give one example?

Zeigler Jump into... You know, this is a story of success in India, is the BT cotton. And looking at how that particular crop was taken from a very low level of productivity using a lot of water, and really not a high-quality material, to where it is today in India is a real success story of BT cotton. And it’s not just for the fiber itself. Byproducts of the cotton are now part of a growing market in India as feed for animals and oil. And there’s a lot of other uses for the cotton. So if you look at how you can take crop by crop and improve those crops in a system supported by policy, you can have great success. So I’m hopeful in that respect.

And back to the toolbox, the toolkit that Shenggen was mentioning—I actually looked at the Agritech Toolbox, and I think it’s actually quite a useful tool for looking at future. Where are some of the best bangs for the buck in improving yields of wheat, maize and rice? And, depending on the crop and depending on the region, it’s a great tool for policymakers to look at and to see, where can we

direct our scarce resources, and where can we make a policy impact in these crops to improve yield?

And I thought it was fascinating how, at least for wheat and maize, much of the impact that's going to come is going to come from no-till agriculture, most likely, as well as some heat-resistant varieties.

So those kinds of toolkits that are very easily accessible, easy to view, can help policymakers shift their resources into these areas that make the most sense.

Conway Just a bit more about precision farming. I mean, there's a general view that precision farming is an industrialized country technology. You know, you've got your GPS system on the tractor and do all of that. But it isn't, is it? I mean, you can apply the principle, not necessarily the practice. Microdosing seems to me to be a very good example of the precision farming applied in a developing country. Are there other examples like that?

Zeigler Another example, I think is a good example, is from Colombia, the CIAT, the Center for Improved Technologies for Rice, or Agriculture in the Tropics – I'm sorry – CIAT, has recently won an award from the U.N. as part of the big data challenge where CIAT scientists used open data and data supplied by the Colombian government to look at drought trends over time in the country in a rice-producing zone. And their analysis said that perhaps you may want to consider planting at a different time this year. And it saved something like 5,000 acres of rice crop from destruction, because farmers now had information about trends that they would not have ever known about on their own. So that's an example of how to tailor technologies for smallholder farmers using data and in partnership with national agriculture research centers and the CG.

Conway Are these kinds of examples you're talking about, are these game-changers in a sense or not?

Zeigler I think if they can be scaled up, yes, yes.

Conway That's a real challenge.

Zeigler Yes.

Conway I mean, everywhere you go in Africa you see in a village a nice project and something done by an NGO or even by the government, but it's just in that village.

Zeigler Uh-huh, well, I think this is where the partnership with the private sector can help. It's in the interest to support farmers. You want farmers to buy more of your products, and so you want them to be successful; and so you can deliver a suite of services either through mechanization or through seeds or fertilizers.

Conway What you're saying is that the answer lies in linking farmers to markets and linking farmers to value chains.

Zeigler Yes.

Conway That's when you scale up innovative technologies, through that mechanism.

Zeigler And services, uh-huh.

Fan In addition to other precision technology, simply leveling the field can enhance yield by a big margin and save the water. I have seen that in India and China. Very simple.

Conway But Ken is saying that just doubling yield won't bring farmers out of poverty.

Fan Well, I mean that's a different issue. Reducing poverty and increasing yield is correlated but not necessarily a hundred percent correlated. The farmers can easily move out of agricultural, I mean out of poverty.

But now I wanted to emphasize why the technologies have not been able to scale up. Institutions.

Conway Ok, let's come to institutions in a minute. Just go back, Marc. Are these game-changers, these kinds of technologies?

Sadler I think we need to obviously see this in two real, two time scales. So we're going to continually be hit by things that we didn't expect, and that means managing risk in the short term. We're going to have to make our farmers and our fishers and our livestock people... For example, a real challenge has always been to get – and Jimmy's sitting there – but investment in veterinary services for livestock.

One of the things we know about climate change is that the known unknowns is going to be much worse. Pest and disease is much more likely to be the things that kill our systems...

Conway That's right.

Sadler ...than drought. And yet it's always been a challenge to get people to invest money – ministers of finance, farmers, companies, in veterinary services, good veterinary services. But the reality is, we literally have billions of dollars worth of assets wandering around our landscapes – so that's the trader in me, right? – billions of dollars, which also happen to be the piggybank of the poor. Billions of dollars of the poor's assets wandering around landscapes with literally no protection, and no one's been taking that seriously for a couple of decades.

So these are game-changers, but we have to get them out there. But we have to tell the story. The trouble is, as a community we don't tell stories very well. We have to be able to clearly show how this is about income, how it's about livelihoods, how it's about food prices for the urban dwellers. Because I haven't heard so much conversation, but we're really close to the point where more people live in cities

than live in rural spaces. And guess what? They don't produce much food, and they drag all the labor off the land.

And I was speaking to Mr. Wu from Heilongjiang Province up in the North. His biggest problem was not how to grow, wasn't which tractor to buy, wasn't which combine, wasn't where to get fertilizers. His biggest problem for him and his three other friends who ran the cooperative – they didn't have anyone who could do simple accounting. They were a business; they never used to be. That was their biggest problem.

Conway We're getting into institutional factors now. I want to just spend a little bit of time on that. One, of course, is about rights to land. Unless you've got rights to land, you're not going to get involved with markets and with value chains. We've got some good experiments going on, for example, in Ethiopia at the moment, where land rights are being given equally to men and women in a family.

Fan This is so critical. I remember more than 30 years ago I was in China. Land was owned by the collectives, operated by collectives. Farmers didn't have any incentive. But in 1979, 1980 the land was given by farmers, let them operate. The productivity increased dramatically, so from 1979 to '84, five or six years, every year agricultural production has been going up.

Conway But the trouble in Africa is that so much of the land is communally owned.

Fan Yes. Sure.

Conway And that makes it more difficult to establish rights.

Fan This morning we had a session where we had two Ethiopian farmers to speak about their farming activities. It seems to me, yes, securing the land rights is so critical. So if they don't have secure land rights, they will not be able to consolidate their size, they will not be able to optimize the size, and they will be very vulnerable to so-called "grabs," land grabs from many other countries.

Conway Leo, I know everybody's interested in, but you are, is the issue of livelihoods for both women and for youth. You've got, Africa is the youngest continent on the planet.

Abruzzese Right now we are going through a massive youth bulge around the world.

Conway Right.

Abruzzese Do you know the average age in most countries in Sub-Saharan Africa, less than 20 years old, the average age. In India, very big... now, unfortunately, in Africa part of the reason for that is AIDS, which is why the average age is so low. But even in India, it's only about 25 years old.

To go back to a point Marc made – most of the young people, they're not on farms; they're going into urban locations. So if you want to look at a concerning issue – We have this huge youth bulge. Young people are entering the labor force, which means they have the potential to be productive, to add to GDP; but they're not going to be on farms, they're going to be in cities.

Now, what's interesting is we do a lot of work on gender economics, and there's a term right now called the "feminization of agriculture." You're seeing more and more women involved. That can be both a good and a bad thing. We saw in the video, you've got a lot of very bright, talented, educated young women who are going into agriculture. But on the other side of it, in a lot of poor countries the women are left behind to run the farms because the men are going into the cities to take advantage of manufacturing jobs.

And that would still be all right if the women in agriculture had access to resources. There have been all sorts of studies by FAO and others that said that, if women farmers had access to the same resources, the same access to capital that men do, the productivity on those farmers would be vastly higher. So, even before we talk about the technology, if you can just get women farmers culturally, get past the point where they can have access to the same resources, that alone can make a difference.

Conway On the question of youth, people say, "Oh, the problem with young people is that they don't have any assets." And so they say to me, "Oh, they can do beekeeping because then you don't need any assets." And I somehow have got this vision that the whole, the youth of Africa are going to be beekeeping.

It's very difficult to have a generic solution to this. I mean, the only one that I can think of is mechanization. If you get mechanization... I don't mean great big American-style combines. I mean, small machines such as are used in Asia, then young people get involved in making them, they get involved in servicing, they get involved in repairing them. I've seen young people in Uganda taking the machines around from one, huller machine, from one village to another. But I don't know of any other generic solutions for young people. Anybody else got another generic solution? I don't mean a specific one.

Fan Let me come back to this. I think it's very dangerous for young people to move to cities without jobs. That would create urban slums, create a conflict, or even...

Conway But they're doing it.

Fan Yes, but why they're doing it? Because they do not have opportunities in rural areas.

Conway So what...

Fan They do not have access to land.

- Conway So what are the opportunities they could have?
- Fan Part of the land, part of the reform, part of the change, or institutional change is to give the land to these young farmers – one way or another, whether they took even as a lease, a rent, not necessarily an ownership – and to provide services to them.
- Conway But they may not want to be farmers – that’s the problem. They may want to be something a bit sexier.
- Fan Sure. Well, again, I think many of you said that we should treat agriculture as a business. I think Kanayo said it very well – treat it as a business, treat it...
- Conway I’m going to come to the audience to ask for... I’ve got 15 minutes and a minute for questions and answers, if you’d like to ask questions and answers. We could go on talking forever, but it seems to me it would be good to have some questions. But just before we do that, Margaret, just say something about trade. We all know that there’s enormous problems. We’re getting better global trade, but there’s also huge problems of getting regional trade. I mean, it’s very difficult just to trade between Kenya and Uganda – you can’t even get across the border, of course.
- Zeigler Well, you know, so many of these global and regional trade agreements are up right now, being negotiated. And one of the areas we wanted to highlight, which is the TFA, the Trade Facilitation opportunities that are out there, and hoping that, if that can move through... There’s a big focus in that on smallholder farmers and helping those farmers have the skills to comply with sanitary and phytosanitary requirements to be successful.
- In our last year’s GAP Report, we actually focused a little bit on this issue with one of our consultative partners, IICA, which has been able to successfully do a lot of work in Central America and Dominican Republic with building the capacity of smallholder farmers to take advantage of other markets in the region. So partnering with institutions, regional institutions, trade groups, private sector – it’s a way to bring together that capacity that’s needed for smallholder farmers to get into regional and global supply chains. But those customs, those entries, those transport, those barriers have to come down so that the smallholder farmers can take advantage of that. And the TFA is one way that we think could be very helpful, and hopefully this process in the next several months will move forward with some progress. So we’re advocating for that.
- Conway I mean, there’s a growing demand in Africa for food, more nutritious food and more diverse food. But it’s extraordinarily difficult just to move food from one country to another. You can move diseases easier.

Question and Answer Session

- Conway Okay. Anybody want to... We’ve now got 12 minutes. Anybody want to ask a question of the panel or make a one-second statement?

- Question Sure, I'll ask a question. I would like to ask the panel to have some comments about how, in our economic assessments of what our options are and the practices we use to drive greater yield gains, can we look at what implementation strategies also have the corollary effect of building the natural capital of soil fertility and watershed management quality.
- Conway Okay, good. Behind you, second question.
- Question I'd like to hear – I'm Rich ___ from Strategic – would like to hear how we scale for smallholder farmers when smallholder farmers exist by the million, ten million or hundred million, depending other country.
- Conway Okay. I think that last question comes to you, Margaret. But the first one, the costs – the first question.
- Zeigler Well, I can say something about Rich's question right now, the scaling issue. You know, great examples in many places, but in India, Operation Flood, the White Revolution, incorporated millions of smallholder farmers that had between one to three cows each, many of the women farmers in India. And there was a great focus by the government of India to organize through the National Cooperative System and partnering also with The World Bank and some private sector partners to really help develop an entire system, a value chain where not only was their milk production but there was collection of the milk and development of cold chain. And then now it's feeding into higher-value products, not just milk but all types of additional products.
- So where there's a focus by the government and participation by private sector and help of multilateral institutions and other investors, you can create systems that will help that scale, even when you have many, many, many small farmers, and they can participate in that.
- Conway I think the answer lies in having long, relatively sophisticated value chains – that's how the scaling up occurs. Is that right?
- Zeigler Right.
- Conway Shenggen.
- Fan Well, to just the cost, also benefits of addressing the yield gaps. I remember IFPRI did some studies in Africa, West Africa and East Africa, West Africa together with the CORAF – it's West Africa Agricultural Research Network; and East Africa with ASARECA – again it's Eastern and Southern Africa Research Network – to look at the yield gaps, how much, how big it is, what sort of approach can be used to address a yield gap, not just technologies, actually it's more policy issues: food and others, input use, access to market, improvement in infrastructure. So we would look at both the cost and the benefit side. The cost and benefit ratio is so huge, and the poverty reduction impact is huge. I don't have the numbers in my mind, so

you can check our references, the two reports, two IFPRI research reports on that issue.

Conway Marc?

Sadler Yeah, just a couple of things there. On the economic assessments, I think focusing on what the opportunity is and what it will deliver but also focusing on what the downside is if we don't act, you know, the difference between business as usual and what we could actually achieve. And that's very powerful with ministers of finance.

The other thing is, we tend to actually focus – and I think this is the thing we need to step away from – on sort of very much a domestic agenda when we look at most of these economic assessments. The reality is that where the consumers are and where the food is going to be produced is increasingly going to be different. It's a huge potential on this.

The other thing around the risk piece is actually valuing what the impact of risk is on agricultural sectors. It turns out that ministers of finance have thought for decades they were just subsidizing a sector when all they were actually doing was just paying off the bill after something had gone wrong. It's much cheaper to deal with it before it actually goes wrong.

And on those value chains, I mean, we tend to talk in generic terms and concepts. The reality is that nearly all of the major food retailers on this planet, and I mean in developed and developing countries – they may not know it yet, and increasingly when I talk to them, they look increasingly shocked – their purchasing footprints in my client countries from smallholders is increasing dramatically. The opportunity is, they don't know how to do it. My job is to get people into supply chains. It's a real opportunity to actually deliver on these PPPs now, where we actually get people to produce food that is required by people who want to consume it.

Conway And then they will get out of poverty?

Sadler Well, it will drive income for them. Not only will it... I think one of the biggest things it will give them is it will give them opportunities and choice. So now if farming is a business that makes sense, I now have a choice whether I stay in it or whether I do move to the city. And meanwhile I educate my family and we get better healthcare.

Conway Okay, see those are good questions. Anybody else got a question? Oh, sorry. I thought you'd already asked them. I can't quite see.

Question My question was – Dr. Cassman was very optimistic about raising incomes, providing better education, and stabilizing populations, but you've all avoided the population question. Perhaps you could address how we stabilize population in a timely fashion.

- Conway Second question.
- Question Yeah, I've heard repeatedly through here the discussion of using big data and actually open access to the data, but I haven't heard anything about taking advantage of social media and crowd resources. AmpleHarvest.org has been doing that in the states, but I'm not seeing that yet on a global scale and want to know if anybody wanted to comment on that.
- Conway Okay, and a third question and then fourth, and that's it.
- Question I am sort of interested. We're moving a lot of people off rural areas into communities which are much larger, with inadequate education and not very much job potential for many of these people. So, if you look at the developing world that has changed, there is a fair amount of unemployment and underemployment. So where does this lead into the future if we have more unemployment? Europe is somewhat stagnant at the present time, and some other economies are not growing to the rate at which people think they could or should. So I'd like to hear – What are we going to do with the people?
- Conway Okay, please, madam.
- Question I'm going to ask the sort of, food system question. A great deal of emphasis has been put on staple crops. In the United States, if everybody ate their five servings a day of vegetables, we would run out of vegetables very carefully. How do we design the food system that provides nutrients that people actually require, not simply the calories that make it so that more people on the planet are overweight and obese than undernourished.
- Conway Okay. First question was on the population.
- Abruzzese Let me just deal a little bit with population just very quickly. Let's start with incomes, and we'll come back to population. Seven of the ten fastest-growing countries in the world this year are going to be in Sub-Saharan Africa, so incomes are rising. When incomes arise, we know for a fact that generally fertility rates go down, population goes down.
- Related to that, too, some other work that we've done – 20 years ago the average girl in a developing country had eight years of education. That's now gone up to almost 12. So higher education and higher incomes should bring down fertility rates and should help to manage the population.
- Conway But interesting that it's not happening in Kenya and in Eastern Africa. And the argument is that there's a lot of unmet need and that policies in recent years have prevented the spread of contraception. But I don't know. It's not coming down – fertility rates are not coming down in Kenya where you'd expect them to.
- Abruzzese Not in Kenya, but they are coming down in a lot of other places as well, though, too.

Conway Okay.

Abruzzese So access to contraception is one of the issues here as well too.

Conway The second question, which was...

Fan I don't know the open data. Definitely the ICT technology can be a game-changer, in addition to the technologies that are more related to food production, so the farmers are able to access to the information on prices, technology. For example, Ethiopian farmers would be able to access the price information, the commodity exchange and Addis Ababa provided – maize, coffee, tea. So that's critical.

Now, I wanted to come back to the third question about our food system. Again, part of the problem is policy. We're messed up with the policy. We subsidize staple food production, and this is particularly true in developing countries, usually wheat and maize, and wheat are subsidized – free water, free electricity, subsidized food and others. Add to the cost of vegetables, fruits, maybe to some extent, meat. So if we can remove the subsidies and use that money to support a more nutritious food, that's a good start.

Then the knowledge and information to educate mothers, educate school children about the nutrition elements of different foods. You know, it's still the case in Vietnam and China – the children think that McDonald's foods have enough nutrition.

Conway Just it is important to recognize that Africans have been the great innovators in the use of mobile phones and similar technology; I mean, they're ahead of the rest of the world in what they've been doing there. And I think they're going to be able to do that to help farmers. We've still got a question. Fruit and vegetables – is that the last question?

Sadler That was the piece around the food system. I mean, I think part of this is actually creating that space where the public and the private sectors come together. We don't actually really have that, and that's the thing that we need on the planet. And there's a quick plug for the Global Alliance in Climate Smart Ag, but we have to bring these sectors together. And the way that we address behavioral change, and nutrition is a good example. I mean, if we actually take an analogy, which was how we went about trying to get people to give up smoking, we told them for decades it was killing them, and they still kept on smoking.

I mean, there are other game-changers here, and we have to be very aware of what they are. I'm not sure that we do at the moment. A very wise lady told me not so long ago that what we actually need is silver buckshot and not silver bullets. And I guess one of the things that... fortunately, she wasn't holding a gun. But I think that point about – it requires multiple actors; it requires a cross-section to come together. And we need to pull all these things together. And the problem is that we generally don't. We just go down silos.

Conway Okay. We've got to stop. I've got this clock ticking here, and it's going to blow up if we don't stop. There were two bits we were going to talk about which we didn't. One was about policy research, and needless to say, Shenggen is all in favor of policy research.

But the other one is about political leadership. We know that the countries where there have been real advances in agriculture have a great political leadership. We just have to think of John Kufuor in Ghana. You think of what's going on in Nigeria now with Akin Adesina and what's been happening in Rwanda recently with Agnes Kalibata and so on. I mean, you know that, if the political leaders get behind agriculture, it works, and that's what's important.

Where have we come out in all of this? I'm not quite sure. The difference between optimists and pessimists is largely genetic – that's the first thing you have to recognize. And most of us in general are optimists, but I'm not as optimistic as this crew are here. I mean, basically, I think what they're saying is it's not quite as bleak as what Ken said.

I think it's bleaker than what Ken is saying, in particular because of the livestock demand for grain and so on, and because of climate change. It's true that it may not be the extreme events that are going to kill us, but the things that are going on now, for example, in Africa with shortening of growing seasons... You know, in Northern Ghana the rains come a month late, they finish a month early; temperatures are now rising to the point at which corn crops in particular are suffering, and so on and so forth.

That's enormous, and I think it's a very big job. I think we actually have... And I'm going to say this, and I don't think Jimmy is in here. I think in many respects the challenge we face now is of orders of magnitude greater than what Norman Borlaug faced. Now, that is not to diminish what he achieved. He achieved an enormous amount, because he eventually fed the world for a couple of decades, and that was a great achievement, tremendous achievement. But what we're facing now in terms of accelerating yields, in terms of accelerating yields on single amounts of land, on a certain amount of land, of reducing inputs of pesticides and fertilizers, of increasing natural capital, of reducing greenhouse gases from agriculture and making it more sustainable and resilience – that's a very, very tall order. And that's why, in the end, I think I'm more pessimistic than these guys and even more pessimistic than Ken.

Thank you all, and thank my great team.