2013 THE "BORLAUG DIALOGUE"
October 17, 2013 – 11:00 a.m.
Panel: *Gebisa Ejeta, Moderator*

PANEL:

TRANSFORMATIVE POLICY: FOCUS ON AFRICA

Introduction:

Ambassador Kenneth M. Quinn
President – The World Food Prize Foundation

We have a wonderful panel to follow on this. I don't know that we've ever had a more substance and action-packed morning at The World Food Prize, except perhaps when Dr. Borlaug spoke alone.

So we're so very, very fortunate to have dynamic leaders from Africa here. My wonderful friend, Minister Adesina, from Nigeria. I mention him first when we were in Ghana together, and we slipped off to the side and had breakfast. And I said, "Oh, my gosh!" Just really got to know each other. He had such tremendous ideas and energy, and I said, "You know, it's too bad he's not in a position where he could implement that," and now here he is. And sitting next to him is one of the great African women leaders, Florence Chenoweth, great friend of ours and associated with the state of Wisconsin, where I grew up. Former Prime Minister Mayaki, now the head of NEPAD – what a dynamic organization that is. And Chris Elias here from the Gates Foundation. And of course the moderator, our 2009 Laureate, Dr. Gebisa Ejeta.

So I just want to say in the context of Norman Borlaug's three dreams that I talked about yesterday, which was that biotechnology could make wheat immune to rust disease, that he could inspire the next generation and that the Green Revolution could come to Africa, that this day and particularly this panel and particularly you personally and your organizations and our laureates, that you're making Norm's dreams come true.

So with that I'm going to turn it over to our moderator and get out of the way, and carry on.

PANEL:

TRANSFORMATIVE POLICY: FOCUS ON AFRICA

Panel Moderator:

Gebisa Ejeta
2009 World Food Prize Laureate

Panel Members:

Chris Elias	President, Global Development Program, The Bill & Melinda Gates Foundation
H.E. Akinwumi A. Adesina	Minister of Agriculture and Rural Development, Nigeria
H.E. Florence Chenoweth	Minister of Agriculture, Liberia
Ibrahim Mayaki	CEO, New Partnership for African Development (NEPAD)

Gebisa Ejeta

Thank you very much. It is a distinct pleasure and a great honor for me to moderate this illustrious panel. I don't want to spend or waste any time trying to introduce the panel. I think the president has already done that very, very well. I just wanted to provide a little bit of context into what these four individuals bring to the table, representing more themselves and the organizations that they represent, in that I would say that we've got three groups here – a group of doers representing the most populous nation in the continent of Africa, and so in all aspects, both with resources and everything else, it can't get any bigger than Nigeria in Africa, and the minister of agriculture from there.

And then you can't get much smaller than Liberia in Africa and the struggles that they have rebuilding their nation. And then the Former Prime Minister of Niger, who is now the CEO of NEPAD, the New Partnership for African Development. And at the far end is the president of Global Development for the Bill and Melinda Gates Foundation, Dr. Chris Elias, who is a physician and oversees the global development program but also is in charge of both health and agriculture.

PANEL DISCUSSION

Gebisa Ejeta — And so with that we have the funders, the facilitators and the doers. And so I would, with your permission, Mr. Minister, I would start my question with you. Within the theme of the conference, Nigeria, the most populous nation in the continent of Africa, a nation so endowed with both renewable and nonrenewable resources and with relatively far better sets of institutional infrastructure in the continent of Africa and a tremendous cadre of trained manpower, even though still far too many

still work and live overseas, this country had the potential to be an example and lead development in the continent of Africa. Nevertheless, with all of these opportunities, Nigeria, just like its sister smaller nations of the continent, had not developed and development had lagged behind. Yet, the last few years there is a little bit of buzz about Nigeria and Nigeria's government and also in particular about its smart, articulate, energetic minister of agriculture that had come to Nigeria. And so my question to you is – after decades of illustrious career in global development, both with the CGIAR system and then also lately the last couple of decades particularly in the Rockefeller Foundation, the leadership that you've provided there. And now you're coming back to Nigeria. And I'd like to ask – What was the basis of change, the vision and the goals that you brought with you for Nigeria coming in? And what has surprised you the most. And if you may – What are the examples of the many programs that I know you've rolled out since taking the helm at your large ministry?

Akin Adesina

Thank you very much, Gebisa. It's a delight to be here. I want to thank the World Food Prize Foundation for inviting me. One thing that Gebisa didn't say is that I also went to Purdue University where he was a professor, and he was a professor at the time I was a student. But he's so tall, and so I'd like to also tease him that the tall stature varieties and medium stature and short stature varieties, I belong to the latter, and so he's always – you can tell him out in a crowd anytime. And we are very proud of you, I've got to say.

Let me say that the issue of Africa - most of the times when we think about Africa, we think about poverty, we think about misery, we think about malnutrition, hunger. That's not to say those things do not exist, but we shouldn't forget that Africa has changed tremendously. First and foremost is the fact that ten of the fastest-growing economies in the world are actually not in Asia or Latin America. They're actually in Africa. And Nigeria happens to be the fourth fastest-growing economy in the world.

When it comes to Nigeria, though, the issue was in the 60's we used to have… we were dominant in agriculture. We're number one in palm oil production, we are number one in cotton production in West Africa, we were the second largest in cocoa production in the world. And so we play globally. Well, what happened was we found oil – and once we found oil, we forgot all about agriculture, and we're paying a very big price for that today. We were spending about $11 billion buying basic things like wheat, rice, fish and sugar. And so for me, when I became minister, it was clear to me that that is not sustainable politically, economically for us. And therefore we had to change.

Now, the president launched a program called the Agricultural Transformation Agenda. And we said to ourselves – well, look. What we

have to do is to diversify the economy away from oil and that in doing so we must also have inclusive growth that's able to take millions of people out of poverty. And the sector that has the greatest power to do that is agriculture. But in picking agriculture, we must ask ourselves – what type of agriculture?

We decided as a government that agriculture was not a development activity. I don't believe agriculture is a development program. Agriculture is a business; it's a straight-line business. Whether you're in seed or fertilizer or in storage, processing, value-added logistics, transport, export, everything about agriculture is a business. And so we decided that fundamental to our reform is changing our mindset about agriculture as a business.

Second is that we were not just going to focus on producing commodities. We're going to add value to every single commodity that we have. In other words, turn our comparative advantage in primary commodity production into a competitive advantage.

And finally is that we are going to be investment-driven. Because when it comes to the issue of lifting people out of poverty, I believe what we should be doing is wealth creation; and where you're going to create wealth, you have to let the private sector in the game. So we decided we are going to run a government-enabled private sector led transformation.

And so we set for ourselves the goal to produce 20 million metric tons of food by 2015, but it was starting from 2011 when I became minister – that is 5 million metric tons every year – and that we are going to create 3.5 million jobs by agriculture, and we are going to work on that. Now, for that to work, though, our farmers must be able to get their seeds and fertilizers. If they can't get that, there's no game at all.

Well, here's the problem in Nigeria. Between 1980 and 2010 we spent roughly $518 million, $5.6 billion rather, subsidizing fertilizers. Out of that $5.6 billion, only 11% of it actually reached the farmers. So the big fat cats get it, the ransackers get it, the fertilizers, which are supposed to be urea and NPK, they develop hands and legs and walk away from the farmers. And so we decided that we had to end that.

It took us exactly 90 days, when I became minister, to dismantle a corruption of 40 years in the country. We took the government out of it completely, because, just like soda – you can go everywhere, you find soda. Well, you can't find seed and fertilizer because the government was distributing it. It was actually taking the private sector out of it, and the governments were just taking over everything. So we did that.

Secondly, we did one thing, and that was to use mobile phone technology. For those that know Nigeria, you notice that we have a lot

more mobile phones than we have of television stations in the country. So we decided to use that to reach our farmers, target farmers better. And so we used mobile phone technology to do what we call "electronic wallet," so we can target the farmers. And it worked. For the last two years we have reached over five million farmers, each one of them getting their seeds and fertilizer vouchers over their phones and going to private sector agrodealers and redeeming it straight from them.

And that has made a huge impact for us, that in one year our farmers produce 9 million metric tons of food. And that's what happens when you have the right policy reforms.

And one last thing I want to say, which is actually fundamental to what we've done, is the fact that we decided also that we've got to get a lot more of our banking system to fund agriculture. They will not fund agriculture as a development program, but they will fund agriculture as a business. And that's working very well for us. And here we have one of our commissioners. We work very closely with the state governments. The Kano state commissioner for agriculture is here.

So, Gebisa, all I can say is that, when I became minister, I knew that the tough job was hard. I think after I became minister I knew the job was really tough, but I can tell you that, in the last one year we've been able to reach millions of farmers, we've been able to get private sector in the game, we've been able to get our banks to lend more, and we've fundamentally changed our perspective from agriculture as a development program to agriculture as a business.

Gebisa Ejeta — Thank you very much, and thank you also for making my life difficult. I don't think I'll be able to get back to Purdue Campus for not claiming you here as a Purdue alum.

I won't make the same mistake with you, Florence, a proud graduate of the University of Wisconsin. Like, Akin, you too spent decades out in diaspora, both in the United States and working in various organizations and various African countries. Coming back to a country, Liberia, a very small, poor and proud country, forging a path to economic development, was doing it very well until a ravaging civil war under a brutal revolutionary brought the nation almost to ashes. And then a group of women and other men took up the helm of leadership to rebuild this nation.

And I'd like to repeat the same question – What were the vision and promise you may have made to the nation, and what are the kinds of programs that you have been able to roll out in the last few years and what are the successes out of those programs that you have put forth?

Florence Chenoweth As you said, Liberia is a small nation just on the path to being rebuilt. It is very difficult, I know, for many persons to understand how anyone in their right mind could look at Liberia after almost 25 years of being systematically torn down, completely broken, how anyone could dream that we could rebuild. But there were some of us that simply refuse to let go, simply refuse to accept that Liberia was gone forever.

And so one of the biggest tasks, I think, was trying to pull others along with us to agree to, first thing, to agree to come back and see the ashes, see a nation where you could not even walk because of all of the spent gunshots or shells, see a nation with not one building standing, one school, one hospital, one church, one everything torn apart, and convince people that we could rebuild. It took some time, but I think we have some believers now.

I can best describe the situation as repairing a car and driving it at the same time. We, for the agricultural sector, wish I had it before the madness in 1979, 1980. There was not one pillar on which to build. Our greatest loss in it all was our human capacity. So we started with that, trying to assess what was the capacity to rebuild the agricultural sector. To the best of our knowledge, it was over a 70% capacity gap, so there we started with an agenda of rebuilding the agricultural sector, rebuilding our country to not what it was in 1980 when things fell apart but to that of the 21st century. Call it madness – it is our dream.

In the agricultural sector we started off, as I said, with not one germplasm, not one animal – there was no animal life. I listened yesterday to the panel that discussed animal protein and animal life, and I was like – we can talk about that now too, because we do have animal life again. We do have a viable poultry industry that we are going to shortly replace imported eggs. We do have plants of genetic resource material growing. We have production of our staple. We have already reached one third self-sufficiency. We are on our path to building the human capital again from zero to at least 30% that we're able to run. We have opened our research institute again. KARI will foresee that we have all Liberian scientists – yes, we do have some visiting scientists. So we are on the path to rebuilding. And we do have programs in place, targets, not to achieve the kind of rapid food production that Nigeria can talk about. But Nigeria is a true, big brother to Liberia, helping us in the rebuilding effort. And so, with support from Africa first and foremost, and others, we are on the path to a total rebuild of our nation.

Gebisa Ejeta Thank you. Dr. Mayaki, unlike the ministers, you had served your nation as a civil servant, going all the way to becoming a prime minister, and then you moved on, went to be a professor at the University of Paris and now becoming the CEO of the New Partnership for African Development. In this role as the CEO of NEPAD, what do you see that all

of NEPAD is in the ambitions that these nations have to enhance their economic development through agriculture?

Ibrahim Mayaki Thank you. From the position I hold as the head of the development agency of the African Union, I see three main challenges that we need to tackle in order to really concretize what we call the African Transformation Agenda. The minister rightly highlighted the fact that six of the ten fastest economies of the world are in Africa. But at the same time, seven of the ten most unequal economies in the world are in Africa, and Africa has that unique characteristic in the history of demographics. Seventy-five percent of our population is under 25; most of them live in rural areas. We have an incipient industrialization process. And because of the oncoming unemployment markets in a medium-sized county like Mali, which is over 20 million inhabitants, at about between 250,000 and 300,000, young people between 18 and 22.

So they cannot be hired by the public service. They cannot find jobs in an incipient industrialization process, so we have to tap into a potential of agriculture. And this is why, since Maputo 2003 where the African leaders decided to make agriculture a priority when it was not then, agriculture becomes really a political issue. It's a business, as our minister was saying, but it is becoming a political issue. Because, if we do not ensure that transformation takes place through an adequate agricultural development, Africa will be in a political context.

Second issue is – In order to solve that big challenge, we need coherence, coherence in terms of policy design and coherence in terms of policy implementation.

What does coherence mean concretely in terms of policy design? We have a continental strategy framework, which is CAADP, the Comprehensive Africa Agricultural Development Program. CAADP has very specific targets in terms of agricultural productivity, in terms of allocation of public resources to agriculture. And at the same time what CAADP does which is quite significant is look at agriculture not as a sector but as a multisectoral dimension. So continental strategy, regional strategy – because CAADP has to be framed regionally within our regional groupings – and then we need that coherence between the national investment plans and the regional studies.

Why am I saying that? Africa is a continent of 54 countries. Fragmentation is a big obstacle to our development strategies. The optimal solutions to our national problems are not at the national level; they are at the regional level. We will transform when regional strategies will transform the conditions that we have nationally.

But in order to do that, coherence is also essential between the national level and the regional level. Our role, as NEPAD, as the African Union, is

to facilitate that coherence and make sure that transformation is inclusive, through a sound agricultural development targeting small-scale farmers, empowering them, transforming them as micro-entrepreneurs. Small-scale farmers are those who to date feed the continent. If we empower them sufficiently through the right policies at the national and the regional level, then really that transformation can take place.

Gebisa Ejeta — Dr. Elias, when the Bill and Melinda Gates Foundation, a few years ago around 2006, entered the agricultural development arena, many, including myself had dubbed the Foundation as a game-changer, because the implication there was the Foundation was seemingly not endless but a lot of resources and a will and a commitment to engage embarking to assist African development with great enthusiasm and no history of entangling bureaucracy, a very fresh outlook and unprecedented commitment and resolve. So has the game been changed much?

Chris Elias — Thank you, Gebisa, and thank you to Ambassador Quinn and the World Food Prize for inviting us to participate today in this important panel.

It may be helpful to respond to your question… The Bill and Melinda Gates Foundation is on a journey, and we began about 15 years ago with major investments in health. As we progressed, we came to understand that many of the people that we were trying to benefit through our health programs were smallholder farmers in Sub-Saharan Africa and South Asia and other places. And it became clear to us that, if we're going to achieve our vision, which is a vision of a world where everybody has a chance at a healthy and productive life, we needed to look at agricultural development. We needed to understand how beyond the health interventions we were pursuing, we could work closely with people like the minister and NEPAD, and the African Union on how to improve the lives and livelihoods of some of the poorest people in the world, many of whom were farmers living in some of the most stressed agricultural environments in the world.

And so we began that journey, as you said, about seven years ago. And if I think about our journey in that past seven years, I think the one word that captures it most is "partnership." And that's why I'm particularly pleased to be here today with the ministers and with Dr. Mayaki. Because what we've tried to do is to understand where African countries are coming together, either individually in some of the examples that Akin noted in Nigeria or collectively with a continent-wide plan as reflected and begun ten years ago by the African Union and NEPAD through the Comprehensive African Agricultural Development Program.

And as we come to the tenth anniversary and as next year the AU has declared as the Year of African Agriculture, how do we form partnerships with ministries, with continental bodies such as NEPAD to advance agricultural development and ultimately to give the benefits of science

and technology the innovation that has so transformed agriculture around the world, put them in the hands of the smallholder farmers, many of whom, the majority of whom actually, are women. So we are also concerned about the gender equity in light of the Millennium Development Goals, etc. So that's how we've approached it, is what's the alliance.

I had an opportunity just two weeks ago to be with Akin and President Jonathan in New York where the President of Nigeria convened his Eminent Persons group and Bill Gates spent a morning together with others understanding what some of the challenges are in that transformational agenda. We're very happy to partner with Nigeria as you take that transformation agenda down to the state and local government agency, which is where the change has to happen, where some of the national policies become benefits to smallholder farmers.

We're very happy to partner with NEPAD. The African Union's high-level panel on biotechnology had a recommendation about the need to strengthen the regulatory and biosafety capacity of African countries so that African countries could responsibly embrace the full range of scientific and technology innovation for benefiting African farmers. So through the African biosafety network of experts, we're engaged together with NEPAD and Michigan State University in providing training and facilitating and skills development to build the regulatory and biosafety capacities around Africa.

We partner, for instance, with the African Agricultural Technology Foundation, which is leading a very creative public-private partnership to develop Water Efficient Maize for Africa. If you look at the scientific data about the consequences, the likely consequences of changes in climate, stressing further already drought-vulnerable areas – maize being the number one, 300 million farmers dependent on growing maize, already suffering from periodic droughts – climate change is going to make that worse.

So innovating, using again the full range of science, traditional breeding, marker-assisted breeding, agricultural biotechnology to bring the benefits of the cutting edge of plant science, crop science to the poorest farmers in Africa is another example.

Similarly we're working to build – you know, Florence mentioned the challenge of human capacity. It's one of the challenges, not just in Liberia but in many African countries. So we have a new partnership, a new project with AGRA, working together actually with Iowa State University on trying to come up with a new curriculum for training plant breeders, getting out of the traditional academic classroom-based model with a sort of academic thesis project to a much more practical - beginning with an online curriculum - and a practical experience with internships with some

of the continent's experienced breeders, case studies of successful breeding from both Africa and Asia, again bringing the latest best practices in plant science to the national agricultural research organizations, which are going to forward this agenda at the country level.

So we are very happy to be here today on the panel and more importantly to be in partnership with countries like Nigeria, with organizations like NEPAD, to empower African countries, as we enter this next decade of African agricultural development. It's an amazing time, given the economic development trends Akin mentioned, given the potential to capture the demographic diffident that Dr. Mayaki mentioned.

So we are happy to be partners with that and happy to be here with you today. Thank you.

Gebisa Ejeta — If I may come back to you – With this lofty goal of developing partnership to reach the goal of African develop, if you may share with us what have been the challenges, the surprises, if any, that you may have faced as a foundation, to play a key role using your convening power to facility these partnerships for effective development process.

Chris Elias — Yeah. Again, you know, we're on a journey both in our health and agricultural programs. We're a large philanthropy. We bring considerable, as you mentioned, considerable philanthropic resources. But we also bring the important voice of the Foundation, of Bill and Melinda themselves, who have been very strong advocates for science-based, evidence-based decision-making in health and in agriculture and in the other areas of development where we work. And we bring the technical collaboration of our staff.

And so some of the challenges, I guess, and this applies again to both health and agriculture, is to see the comprehensive solution, to think through the entire value chain from upstream discovery. We have incredible science, the pace of new science in genomics and bioinformatics, etc., is breathtaking. How do we harness that for achieving solutions for some of the poorest farmers in the world?

So we invest in discovery, but then how do you link discovery to global product innovation, to national adaptation, turning that into varieties that local farmers want and will use? And then how do you connect that to the input and agronomic systems necessary to actually achieve the benefits? If all we do is produce higher crop yields and we don't deal with the problems of seed systems, of postharvest losses, which in many countries are 30 or 40%, if we don't create actual markets, what's the incentive to a smallholder farmer to grow more if they have no access to

the market? A lot of work to watch more things be wasted at the farm gate.

So we have to think through that entire value chain and to think about how to take people who have historically been outside of markets and connect them in a meaningful way that lets them benefit from the introduction of new science and technology to increase in a sustainable way agricultural productivity growth and to contribute to the overall growth of the continent, as well as, more importantly, the health and nutrition of their own families and communities.

Chris Ejeta — Thank you very much. These have been great remarks in terms of introducing the roles each one of your organizations plan in African development. And now, going to the theme of the conference and dissecting the three components that we've been given to talk about – Sustainability, sustaining feeding a growing population has been a concern of this new century with vastly degrading land and soil resources, looming water crisis, and the growth in population, and the limited use of science, technology, innovation in the continent of Africa.

In much of Africa's agriculture, the deep concerns abound in the continent of Africa on how Africa may cope with the issue of climate change – that's really the foundation for concerns about sustainability in the growing population that we have. So the global sustainability agenda, however, as we heard from the remarks yesterday, is getting more and more traction, receiving growing attention from a variety of stakeholders, including the youth, the greater public in the developed world, and from the international organizations including the United Nations.

Now, in that vein and in your view, what is the future outlook of your country in terms of production and agricultural development, given the ramification of climate volatility that I just stated? Maybe, Akin, if you would start that.

Akin Adesina — Thanks, Gebisa. You know, one of the things we experienced last year which was a big challenge for us was the issue of flood. We had our worst flood in probably over 50 years. And it brought the lesson home for us that we actually live in an era of climate change. Whether we like it or not, climate change is here to stay, is here to stay.

The issue is how we adapt to climate change, and the issue also is how do we deploy new tools, new technologies to actually allow us to adapt better. When we had flood in Nigeria last year, I was supposed to come for this wonderful event when we had the peak of our flooding situation in Nigeria. For those of you who are following in the media, you probably will have felt that all of Nigeria was under water, at least that's what the press will actually make you think and you will affirm maybe we're all amphibians under water.

Well, the fact of the matter is that, as we deal with climate change, we must deploy science. One of the things that I did was I brought the International Water Management Institute to my office, rolled up our sleeves for two weeks while the whole media was buzzing. And we were actually trying to figure out, deploying satellite image and remote-sensing tools, how much of our cultivated area was actually affected, how much of the arable land was affected, and how much of the cultivated arable land was actually inundated, and how long would it take for that water to recede. You need more than tools to do that.

So what we found was in fact – contrary to what the media hype was saying, that there was going to be hunger, there was going to be farming and all food crisis. I was the only one in Nigeria that actually stood up and said we were not going to have a food crisis because we had the data, we had the evidence to back that. We found that only 1.4 million hectares of our land was actually affected by the flood. Well, out of that about 446,000 hectares was the one that was cultivated but actually on which we were going to experience crop loss.

Well, put it in perspective: The total amount of cultivated area in Nigeria was 40 million hectares, so 1.02% of it is what is actually going to be affected. And so I tell to the country that we are not going to have a food crisis.

The point I am trying to make is this – hype is not science, that you have to actually deploy science more and more every day. And spatial policy is going to become even more crucial in this era of climate change.

The second thing I want to say about climate change is that we are going to experience the extremes – extreme flood or extreme drought. But one thing is constant, is that intraseasonalability of weather – that is constant. So we've got to develop better tools to allow farmers to adapt as the season progresses with changing weather patterns within the season. So our ability to forecast into a seal rain forecast becomes very, very crucial.

Now, insurance is going to play a big part, and we're trying to do that in Nigeria. I mean, here in Iowa if there was hail, there was too much snow and there was flood or whatever kind of disaster, American farmers are covered, in disaster payments and all of that. But in Africa you have to pray in the morning, pray in the afternoon, pray at night, because there's no cover for you. And so I'm a big believer in prayer, but I think God gave us brains to do things well too.

So in Nigeria we are working, as with other African countries, on weather index crop insurance schemes that allow our farmers to be able to mitigate the impact of climate change on them.

The issue is this – In that debate, who pays for the premiums? If a farmer has to borrow money at 25% interest rate and then pay a high premium for insurance, bonded on top of that, obviously that farmer is out of business – there's just no way they can make it. And we've taken the decision that we are going to, as a government, provide support for our farmers to pay for those premiums to do it.

The two last points I want to make about international environment that you mentioned is that Africa accounts for no more than 3% of the global greenhouse emissions, but we're actually bearing the big brunt of this. And so the principle of the polluter pays must be there; the polluter has to pay. The fact of the matter is that the polluter is not paying enough. I think in the international debate that we are having today is what I can actually characterize as the benevolence polluter paying system. So the person who is causing most of the damage is determining how much they want to pay for causing the damage, and the rest of us will actually have to adjust to those negative externalities.

My view and my belief is that we need to change that international dialogue. Take polluting countries – if their GDP is growing very fast, the question is, if it is growing very fast by creating greenhouse emissions, it means that it's not just your GDP but what is the GDP growing weighted by environmental externalities? And so I feel that in the global environment what we should be talking about is the difference between what your growth will have looked like if you are not creating negative externalities on the environment and what your growth is like now. And that difference is what should be put into a fund and used to support climate change adaptation in developing countries.

Now, the last thing is our own financial market. It's in our interest as African countries. Look at Mayaki, I think, we're talking about the African climate change facility. It's in our interest as African countries to actually have green growth, but we can't just depend on the others for that; we need to get our financial markets to actually allow us to reward farmers for doing better land use management practices that sequester carbon.

So I advocate for African countries to develop green bonds and that these green bonds can therefore be used to compensate farmers for three things. First is, avoided deforestation. Green Revolution will give you avoided deforestation because of tremendous amount of productivity growth – you don't need to cut back land. That's what Dr. Borlaug showed everybody with the Green Revolution. Second is carbon sequestration but actually planting trees, agroforestry will actually sequester that carbon.

So the funds from our own financial markets to support our farmers to make that particular shift. But I do think that at the end of the day the

international dialogue around climate change has to be more balanced. The people who are causing the greatest damage would need to actually do a little bit more financial engineering to be sure that they compensate those that have to bear the negative brunt of this massive externalities.

But there's no doubt in my mind that building resiliency within the system is the critical thing. Gordon Conway who is here is the father of agroecology. He was my boss who hired me in the Rockefeller Foundation. And other bosses of mine… Gary is here, Bob, everybody else. And with the Rockefeller Foundation, one thing that Gordon taught us was the importance of agroecology. I think as African countries we have to really get back to using agroecological principles in guiding our response in such a rapidly changing environment.

Gebisa Ejeta Florence, Akin didn't leave anything to you for you to address. For a poor country, what would be the role of a poor nation such as Liberia? You don't have the luxury to roll out some of the things that he brilliantly is addressing in Nigeria. For a poor country, what is the role of government and its partner organizations to confront this predictably unpredictable phenomena of weather and build resilience into your community of farmers and people in Liberia?

Florence Chenoweth I know we don't have much time, so I will not repeat, because everything Akin has said refers to our situation and maybe even more so. Liberia happens to be the only country in our region that has one hundred percent tropical rain forest. So when people who live in countries that have destroyed all of their forest and want to see Africa keep its forest intact, they descend on Liberia.

We have not only 100 percent tropical rain forest but we also are home to 45% of the biodiversity for our region. So we know we have to be responsible. But we have to live. Even if you want to build a house, when you have to clear the land in a village to build a house, you are cutting tropical rain forest. We also suffer from drought, even though we have this very high rainfall, so the blunt of climate change like Akin said is in our region; we feel it every day. We do the best we can. We feel that we know that we have to, but there's no set way of putting it. We're molested by these outside groups that insist that you cannot cut one tree to do anything. How do you expect us to live? Every inch of our ground is a tropical rain forest, so what do you expect us to do? Eat the trees? That's the question we ask. That's the problem we face. We try to mediate by adapting our planting program so that we adapt crops to different areas and do the minimum deforestation, but we are stuck, because our whole land is a tropical rain forest.

Gebisa Ejeta Thank you. Dr. Mayaki, Dr. Adesina said polluters pay. This was a role that the late prime minister of Ethiopia was leading to develop a dialogue between the developed nations and the continent of Africa. What has

been the role of the African Union and what can it be in the future, particularly in reference to the role that you mentioned about, for AU in terms of coherence and harmonization. It looks to me this is an area where the AU on behalf of the continent could pursue that dialogue and put in place a more current program both towards building resilience in the continent of Africa and perhaps finding resources from some of the campaign that Prime Minister Meles had led.

Ibrahim Mayaki

The African Union is currently doing three things. First of all, it has taken us a lot of energy to shape a common African strategy in negotiation processes. Two, we have been fighting a lot for the creation of a green fund; and, as you know, the green fund is having a lot of obstacles in order to be implemented. But meanwhile, and let's listen to what Prime Minister Meles really did lay out. We should do our own homework by injecting our own resources in our adaptation plans and designing our green economy systems. And he started it in Ethiopia.

In the last twelve years domestic resources through improved microeconomic conditions in the continent have been multiplied by five. So we went from $130 billion to more than $500 billion of domestic resources. According to DAC, the Development Aid Committee of the OECD, today in Africa less than 60 million Africans on 1 billion live in counties where aid is more important than public investment in development issues. So we need to also put our domestic resources into framing our green economy plans – that will be fundamental.

Three – I think data collection, and Akin referred to it, data collection is absolutely essential. It feeds the right policy. If you don't have right data, you can't have a right policy. And the data on climate change has to be really captured scientifically.

And four, three, we need to think not only top down but bottom up. Building the resilience at the bottom will be absolutely fundamental in shaping these strategies.

Now, partnership becomes a key issue. And in the partnership that we are developing with the Bill and Melinda Gates Foundation, we tackle some of these issues directly or indirectly. But the key aspect of our partnership is that we have been able to bring science, technology and innovation as the main priority in shaping Africa's future. And, as you know, I'm showing you this book, which is *Freedom to Innovate,* written by Calestous Juma as well as Ismael Serageldin, who co-chaired the high-level African panel on the Consolidated Plan of Action in Science and Technology.

What has fed the thinking at the level of our political leaders is that science, technology and innovation should be a priority in shaping our future, and the partnership we are building demonstrates that.

Gebisa Ejeta

Dr. Elias, the Bill and Melinda Gates Foundation funds a number of organizations to conduct research to understand climate change and several other programs as well to build technologies that help in climate resilience. I was wondering if you may have a couple of examples that you might share about emerging technologies that may be coming out from these investments that you have made.

Chris Elias

Yeah, and I'll be brief because I know we're short of time. I think the key thing is, you know, climate change, the trends in climate represent the disruption of a very complex system that affects many, many things from agriculture throughout development. And the key thing you need when a complex system is disturbed out of its equilibrium is data, and you need it timely and you need it at all levels. You need it, as Dr. Mayaki was saying, locally as well as nationally.

We've heard some good examples of the application of some of the remote sensing, understanding just how big your problem is when the media may have a different sense of it, being able to target interventions to the areas of greatest need. So I think there's real potential in a digital revolution, not just in agricultural development, but we're looking at this in health and financial services, taking advantage of improved data access. And I think we have a lot to do still to make data more accessible, to use it - you know, it's been useful in transparency and governance across…, getting information into the hands of decision-makers and more broadly so that an evidence-set based set of policies emerge and can be challenged when it's not based upon evidence.

So I think if you look at some of the things we're doing, we're applying some of the cutting-edge informatic technologies to discoveries both in health and agricultural biotechnology. We're looking at how to use digital media for better knowledge exchange and how to strengthen extension programs sought that there's a sharing of experiences from successful farmers in the local areas in their local dialects. We're looking at how to use some of these remote sensing and other digital technologies to improve the statistics.

It's sad at times when you look at how unreliable our statistics are for both health sector and agricultural sector. We need to strengthen that. We need to build the capacity not just of our global organizations but particularly, as we've been talking, at the national level and also at the local level. Not that we have an installed base of mobile telephony that allows us to get all kinds of information to a much more local level, we need to figure out how to capitalize on that, build those digital rails that we can then build information, ultimately insurance, credit, other things that will give again smallholder farmers the full set of tools that we have seen be crucial for the development and transformation of productivity in richer countries.

Gebisa Ejeta

Thank you. This morning there have been a lot of discussion that emphasized this notion that for too long African agricultural development may have focused on increasing productivity and less on profitability and issues of value chain and building the agricultural enterprise in the continent. And maybe if I may ask the two of you if you may give us examples of successful value chain based development programs in your respective countries. I'll start with you.

Akin Adesina

Let me just give one which is on cassava. I mean, Nigeria is the largest producer of cassava in the world. We produce over 40 million metric tons of cassava per year. But if you compare us to countries like Thailand, Thailand produces only 10% of global cassava, but they account for 80% of the global value added. That's because in Nigeria we were not adding value a lot to our cassava. So when I became minister, I found out that almost 45% of the cassava in the country was on the ground and nobody could harvest because the cost of harvesting it was much more than how much they were going to get from the market.

And so we have to start by quickly looking at derivatives that you can make out of cassava. You can use cassava for high-quality cassava flour, which you can then use as flour in making bread. So we decided to launch cassava bread in Nigeria, and that cassava bread is made out of 20% high-quality cassava flour and 80% wheat flour. And it's fantastic bread. It's very low in glycemic index, it's tastier, it's healthier. And I'm sure that all of you that are here, which I brought the cassava bread with me, but I can tell you, I know you are all very handsome folks and beautiful folks around here, but if you had cassava bread, you'd be more handsome and beautiful than you're looking right now.

But that cassava bread is going to save us $1.3 billion U.S. dollars that will straight to the hand of our farmers and our processors and reduce our dependency on what we import.

The second thing we did was to transform that cassava into starch and then cassava starch into sorbitol in oral hygiene but also cassava use also for ethanol.

And so we decided that being the largest producer of cassava in the world was not enough. We had to necessarily become the largest processor of cassava in the world. And so it's by adding value. For example, we are working with Cargill today. Cargill is establishing a 72,000 metric ton starch plant in one of our areas.

But to get these kinds of value-added things to work requires a lot of finance – finance for the farmers, finance for the businesses. And so I think that __ finance is crucial. I think that infrastructure, roads, power, water is crucial for the private sector to go into many of these areas.

We launched, in the country to allow us to do this value-added thing in the rural areas, a new concept that is called Staple Crop Resistance Zones where we actually create incentives for the private sector to go into areas of high food production and actually add value there instead of transporting raw materials out of those areas into the urban centers. And so we are using a combination of fiscal policies, of infrastructure policies to encourage significant private sector investment in these rural areas. And it's working for us.

And what that means, many of the commissioners of my states are here, and they are working with us at the state level. What it means for us is that we create jobs in the rural areas, we reduce urban migration, and we also make sure the postharvest losses that Chris mentioned, that you reduce it because you add in value where the raw material really is, the feedstock really is.

And I think that really for Africa value adding is the key. It doesn't make any sense just to be exporting, you know, raw beans, raw cocoa beans and then eating chocolates from Switzerland when Switzerland doesn't produce a single kilogram of beans. So we've decided we must add value to everything, because that's where the wealth comes from.

Gebisa Ejeta Did you have some example to share in Liberia?

Florence Chenoweth Same thing – adding value. Instead of cassava, I use the example of rice, which is our staple. We knew that the production was going up, but we couldn't feel it because that link of getting it to the market was just not emphasized enough. Now we buy at farm gate, and the processing facilities are placed closer to the points of production. Immediately we have seen a significant drop in importation, because, let's face it, our rice is preferred when it is processed properly and does not have the foreign material, especially the stone. So just that adjustment of using the processing, using or getting the produce bought at farm gate, and people, we didn't have the postharvest loss because we couldn't get it to the market, has made that significant drop in our importation. We need to upscale it.

Gebisa Ejeta One of the things we are supposed to touch on this panel is the issue of biotechnology in the broader sense, about science, technology and innovation. And I wanted to ask if the two of you on the far end would address what role your agencies may have played in encouraging and facilitating both in the formation and promulgation of regulatory and safety loss in African countries and also in providing access to technologies from other programs in other nations for opportunities for intervention in Africa. Maybe, Mayaki, I'll start with you.

Ibrahim Mayaki Chris referred to the partnership we have with the Bill and Melinda Gates Foundation, Michigan State University and NEPAD in biotechnology,

very concretely, were the continental center, but the main funder is Bill and Melinda Gates Foundation. That continental center trains regulators and supports national governments in framing their policies in biotechnology.

So we see biotechnology as a key element in the economy transformation of the continent. We have trained more than 300 regulators up to now. The number of counties demanding our services is increasing, so we are on the right track, and this is the illustration of an intelligent partnership with sound progresses.

And as I was mentioning before, these reserves have also helped us construct the necessary arguments in terms of political economy to show the rationale of using biotechnology in the transformation process of a continent.

Chris Elias

Yeah, again I'll be brief. I think there's just two points to make. One is, our role is really to facilitate and build the capacity for countries and ultimately smallholder farmers to make informed decisions, and we think it should be their choice. And so responding to the high-level panel's call for strengthening of the regulatory capacity, we're investing together with NEPAD to build that capacity.

Similarly, we work again across both health and agriculture in a variety of public-private partnerships. Because one of the things that we've learned – and we've learned this from a longer engagement in health – is that there is tremendous amount of… A lot of the scientific engagement happens in private sector companies who invest considerable research and development resources. We have found that we can successfully harness that innovation. We have to pay very important attention to the terms of that access.

So, for instance, in our work with the African Agricultural Technology Foundation, we support them. They work with companies. They negotiate what we call global access, royalty-free access, rights for farmers to continue to use seed, etc.

So we have to do this so that we can work with the private sector, the corporate sector, to harness their innovations. But we have to do it in terms of ways that guarantee that the resources, philanthropic or government, that are put into it are guaranteed in terms of access. We have had now more than a decade's experience with the Gates Foundation doing this successfully in bringing vaccine prices down dramatically. It's a model. It requires the same cutting-edge business negotiation skills and partnership that we take for granted in industrialized countries. We have to again use that partnership model to make sure that smallholder farmers and the governments that provide

the regulatory framework allow them to have the full range of tools that have benefited everyone else in the world.

Gebisa Ejeta — Thank you very much. It looks like our time is up, and I would like to thank the panelists for the eloquence they showed and the depths of the discussions that we have had, and thank you all for the patience in sitting through this very enjoyable panel. Thank you very much.