

THE WORLD FOOD PRIZE
2008 NORMAN E. BORLAUG INTERNATIONAL SYMPOSIUM
Confronting Crisis: Agriculture and Global Development in the Next Fifty Years
October 15-17, 2008 - Des Moines, Iowa

INTERNATIONAL COOPERATION IN EDUCATION, EXTENSION, AND RESEARCH

October 15, 2008 – 2:15 – 3:30 p.m.

Moderator: Peter McPherson – President, NASULGC

Participants: **W. Ronnie Coffman** – Director of International Programs, Cornell University College of Agriculture and Life Sciences

Gregory Geoffrey – President, Iowa State University

Monty Jones – Executive Director, Forum for Agricultural Research in Africa

Olive Mugenda - Vice-Chancellor, Kenyatta University

Ren Wang – Director, Consultative Group on International Agricultural Research

Gordon Conway

Chief Scientific Advisor, UK DFID

I want to introduce Peter McPherson, who is going to moderate the next session. Peter is, as many of you know, the president of the National Association of State Universities and Land Grant Colleges. It brings together 218 land-grant colleges and public universities throughout the United States.

He also chairs the International Fertilizer Development Center; maybe he's got an answer on that last question on fertilizers, too. And he's been the chair of Harvest Plus, the program of the CGIAR. He was president of Michigan State. He's got a long and distinguished career of chair of Dow Jones, former chair of the USAID's Board of International Food and Agricultural Development, deputy secretary of the U.S. Treasury, former USAID administrator.

And he is now going to moderate a presentation on international cooperation in education, extension, and research – in response to the planted question we had five minutes ago. Peter.

Peter McPherson

President, NASULGC

Well, thank you, Gordon. And can my panel come on up, if you would. I think I see them out here. This panel is on the topic of international collaboration of research, extension and education. We have a very distinguished group of people to talk about it here before you in a moment.

And the format is: I will make a few comments. I will then, instead of them individually making comments separately, I'll ask a set of questions, and I hope they begin to respond to each other. And then after that we want to save a real chunk of time for questions from you – so get ready to go after us here, if you would.

To introduce this panel, first is Ronnie Coffman, and raise your hand. Ronnie is the director of international programs for Cornell's Agriculture and Life Sciences College. He is a plant breeder. His recent huge project is as the principal investigator of the Durable Rust Resistant in Wheat Project, the project that Norm Borlaug really brought to the world's attention and is of great concern to all of us.

Next is Greg Geoffroy, who is the president of Iowa State University, one of my colleagues in NASULGC. He is a chemist by his academic discipline, the dean of the college of science at Penn State University before he took on this function, is a vigorous defender and explainer of the land-grant tradition and what we do and will be a very interesting panel member for us here today.

Monty Jones; Monty, of course, known to all of you because, among other things, his World Food Prize for his work in the New Rices for Africa. He heads the Forum for Agricultural Research in Africa, located in Ghana, and as I say, is known to all of us.

Olive Mugenda; Olive, is the vice-chancellor, which in the parlance of Africa, is the president of Kenyatta, the first woman president to lead a public university in Kenya, a very distinguished leader, administrator, and, of course, professor.

Our next panel member is Ren Wang, who is the director of the Consultative Group on International Agricultural Research, who in that role, a very important role, to all the centers that we know about, a range of experiences, actually affirming a research perspective that I think, Doctor, can be of enormous help to us.

Well, let me begin my comments as follows:

It seems to me, as we've said a couple times here today, this is really the right time to talk about more of this agriculture-related work, neglected for so long by donors and, in some cases, by countries. We all seem to move around in patterns here; the food crisis has risen us up again.

But I think in some ways Gordon's question a moment ago – in some ways, it seems to me that maybe we've finally relearned again the lesson that you can't just give away fish, you've got to teach how to fish, in a broader sense. Because our donor programs have really focused on immediate goods and services. And I hope and understand that it's a broader lesson in training people and so forth.

I'm particularly pleased to introduce these comments today, because the U.S. academic community led by the large public universities, NASULGC, has begun to put together an initiative to see what we can do to help Africans as they see the need to build, or rebuild, African universities. And some of my colleagues here are partners in this whole effort.

I think what we need to understand is that, however we do these things – extension, research, and so forth – this is going to have to be driven in an important part by African universities and countries themselves. We have always said that, but frankly as you look back over the recent decades it's clear that those countries – those institutions, but countries, overall – that took charge of things themselves have been the countries that really have made progress.

You look at the various countries in Asia – China, India and others; these were the countries that said, “Look, we don’t necessarily agree with you on everything, but it’s our country, and we’re going to drive it, and we’re going to look at how to have overall progress in our country.”

And you look at countries that are making the most progress in Africa – just take a couple, but nowhere a full list, Ghana, Mali, and so forth; these countries have decided what they’re going to do. And I look at the attitude of African countries today as opposed to when I was AID administrator beginning in 1981. There is a sense of confidence, a level of human-resource leadership, that I think is very different. And that to me is just so critical.

Now, when we look at agriculture, when we look at what we do in research, extension, and education, I was asked to briefly comment about our land-grant model. And I think that clearly is important, because there’s a lot of history and lessons there; but, as I’ve just been suggesting, it isn’t the full lesson. The land-grant university system has evolved. It wasn’t born exactly this way up-front. As it evolved over the decades, it tied the extension, the outreach to go out there and listen to farmers, if you will, as well as teaching them things, but listen to what their problems were. You went back – the research component was linked in – so you begin to research and think about the issues the farmers had presented, and hopefully turn out new ideas. And all those things you taught to students as it went along, so the linkage was mutually reinforced. And that linkage was an important part of what drove American agriculture.

Now, a couple things that people don’t always remember when we talk about it – and as you can imagine, we’re very fond of our story, for good reason, really – but one, there was a huge amount of government money that went into this, went into it from the beginning and from there on. This was not something that just sort of came from nowhere. There was a major government commitment to research dollars, to extension, and so forth.

And the other component, which I think is even less remembered, is that, beginning at the turn of the century, 100 years ago and steadily more as time went on, was the role of the private sector as a companion for distribution of technology. It was the seed companies, fertilizer companies, and so forth, and they all worked together. And when they did as they usually did – because the farmers were a powerful political group, the universities, the private sector – it drove this engine.

Now, as you think about this, what are the lessons that that might give? But what are the other lessons that we’ve learned since? And I don’t want to be exclusive because we’ll talk to our panel about this, and they’ll have a lot of thoughts, I’m sure. But take this question of the extension, which in some ways is as perplexing as anything – because we don’t have the money to do it the old way, if you will. Well, I think that there are some ways that this new world provides. I say we don’t have the money – it’s worth looking back at all the money the World Bank spent for about, what, 15 years, and established, I think, pretty clearly that it wasn’t sustainable.

But look at the technology that we have now. You saw the cell phone getting prices a moment ago by a farmer. Radio, of course, is ubiquitous. TV – I’ve seen these sun-powered computer screens that gather market information from several parts of the country in Mali and some other parts of Africa. There’s a whole technology revolution. Look at the kiosk that had been tried out in India and some parts of Africa. While you’re feeding information to the village – it essentially

helps check up on whether or not the money was spent the way it was supposed to be spent from the national government, but also is the distributor of information.

I remember the old days at AID; it steps out of agriculture, but to me it's one of the extension concepts. We worked hard at getting family planning around the world, and one of the most effective programs we had in family planning was, we convinced the soap operas in Mexico to plug in family-planning information, sort of, storylines – and it just had a tremendous impact.

We can't think of extension the way, Dr. Geoffroy, you and I have always thought about it in Iowa and Michigan. How do we do it in this new, different world, what Jim Grant did with ORT and vaccinations? Anyway, there's a whole set of new information that is different, and so forth.

Well, what lessons have we learned from research? I think we've learned that you have to be global – like the wheat-rust problem – but you also have to be local. I mean, the corn that you grow here around Des Moines is different, somewhat modestly different, than the corn that my brothers and I still grow, by way of a renter, on our family farm in West Michigan. These are local issues in a range of ways. And that means you've got to have the local university or research system really tied in and to drive it in many ways.

Education; well, I love to tell my university colleagues, we all know we have to change the delivery model a little bit. Our delivery is fundamentally the way it was, arguably, when Socrates was teaching, but certainly 100 years ago. And we're going to have to change it at the margins maybe a lot. And where does the Web fit in, so-called cyber-courses? Now, I like to tell my colleagues, maybe the pressure in Africa is going to have Africa be ahead of the curve in teaching us some lessons of how to do a little different delivery model on education.

Well, let me stop there. I think there are lots of ideas. Remember, our basic theme is, Okay, the world seems to have changed; looking at universities again, lots of pressure and interest. How are we going to – in the agricultural context, we've got these three components of research, extension, and education – what shall we do about this?

And let me start off with Greg, you're my colleague here. What do you see?

Greg Geoffroy

That's a big question, Peter. You know, in many ways you have to tackle challenges like this one step at a time. And, as you said, the local universities, the local needs, are absolutely critical.

I've been particularly impressed with a program that we launched several years ago at Iowa State University, in Uganda, the Sustainable Rural Livelihoods Program, that, at least from what I can tell, has been hugely successful. But it's mainly because we work very, very closely with two partner organizations in Uganda, Makerere University, which you mentioned, and their outstanding College of Agriculture, along with an NGO called VEDCO, who really understand the local culture, how to get things done, how to work with the local population and communities.

We bring a lot of the expertise that we have at Iowa State University in animal science and plant sciences to our partners in Uganda. And then together in a very, very close partnership, we deliver that. We work with local subsistence farmers, small communities, in creating a very small-

scale extension service, in which we work closely with one farmer who then takes that knowledge and extends it to maybe a dozen others, with great success.

But it works because we work so closely with Makerere and with VEDCO. What would not work is if we just went in ourselves and tried to impose what we think we know.

Peter McPherson

Monty, is this triage system through a university – the research, extension and the education – is this going to... There are many countries, many systems that do not use it in Africa. Is that a mistake? Could it be changed? What do you think about all this?

Monty Jones

I wouldn't know if it's a mistake, but I would like to say that in Africa for the past 50 years we have adopted what we call a linear system, in which various entities tend to be working in isolation. So research is working in isolation of a university, and extension is working in isolation of research. In fact, the trend was that research should develop the technology, and the technology would go to extension, and extension would take it to the farmers. And this, I believe, created lots of problems along the line, on the grounds that entities were not collaborating enough.

So basically what we see – and this is that research would come up with very good products, research products, but those products take time to get to the farmers. Universities may come up with a very good product – it would take time to get to the farmers. And basically what has happened is that we have created what we call islands of success, in terms of technology adoption in Africa. So you have very good, credible technologies that do very well in isolated areas, but they cannot translate into continental-wide impact.

And basically what we've seen is that we have been able to increase production to some extent in isolated areas, but we have not been able to transform that increase into increased agricultural productivity, for example, and we've not also been able to influence developmental impact, you know, in terms of creating impact and increasing the livelihood of the people and increasing the income of the farmers and in attaining food security. And, of course, in conserving our natural resources.

So these are basically a problem. And I think that the sooner we get into getting all these entities – research, extension, university and farmers – to come together in an innovation fashion to determine the problem, to develop the protocol, to implement the protocol... Because everybody's involved in this value chain, from research right through to consumption.

Peter McPherson

If there's a lot more resources going into this area, which we hope will happen – people will now shift, the pendulum will shift – is it going to be practically possible to get that back together? Because you have to take extension out of the Ministry of Agriculture, or you have to have... I look at how much trouble we have reorganizing in Washington, and I don't envy anybody that tries to do it.

Monty Jones

Yeah, I think the problem is one of coordination, that we have not coordinated ourselves very well to get all of these entities together. And another problem, of course, is lack of investment to bring entities together and to learn from one another and to create the necessary knowledge that is acquired to adopt technologies, to utilize technologies. So I think coordination and investment and practically, what you mentioned in your opening comments, about looking for resources to support African agricultural, to support African higher education – that might help to bring entities together and get them to function in innovation systems, taking the participatory approaches into consideration – that might help.

Peter McPherson

If everybody's poor, it's sort of hard to talk to each other. Somebody else want to contribute to this discussion? Dr. Wang, please.

Ren Wang

Thank you. I'd like to make a point on this topic of education, and I'd like to say that it is very, very important, of course, to examine what has happened in the past, or even the recent past. But also it is a really opportune time now to look ahead and really to put our heads together to think what we can do.

And on that point I'd like to make a plea that it is really the time for us to realize that there is an urgent need for a global campaign on developing the next generation of agricultural scientists, not only in the developing countries but also in industrialized countries as well. I'd like to quickly give you just one example.

About two and a half years ago, I was visiting Indonesia and meeting with the minister of agriculture. And many of you know that I was working in the International Rice Research Institute based in the Philippines. And so I was talking about the rice programs in Indonesia. And as we know, Indonesia is perhaps one of the largest rice-consuming countries and the most important rice-producing country in the world. And the minister was telling me, in the whole country of Indonesia two and a half years ago, there was not one rice breeder under the age of 50. So there is a serious generation gap and particularly in leading scientists.

Now, what I would feel is that developing the next generation of agricultural scientists is not just the job of universities. The international centers can play a very important role in this business, and the international centers have been very strong, actually, in all of these training programs. And hundreds and thousands of developing-country scientists train in these international centers.

And I'd like to see these centers, sponsored by the CGIAR particularly, would be looked at as preferred partners with universities in the North and South, as well as the national programs for your efforts in developing the next generation of scientists.

Ronnie Coffman

Yeah. Peter just tapped me on the shoulder here. This issue with the rust, which I don't know how many of you are familiar with it, but a new race of wheat rust arose in Uganda in 1999. So I think Dr. Borlaug, who is one of the few people left alive that's actually seen a wheat-rust

epidemic and how devastating it can be, he expected the world community to respond to this thing. But time went by, several years – it didn't happen.

And what you realize is – we don't really have the capacity there for it to happen the way it would have happened 40 years ago. The trained people are not there. It's a real wake-up call. You know, people who were trained back in, say, the '70s, the very active training programs that were associated with wheat improvement, those have feathered off, they're not there anymore.

So before you can go anywhere with extension, you're going to have to really invest in education because you don't have the bodies there for extension.

Peter McPherson

We had in the '80s, in AID – and I know development is much broader than AID these days – but we were educating, in graduate long-term work, about 15,000 people a year. Last year it was 1,000. We've just moved away. Now, I hope that's moving back. But we basically got out of the business. And, of course, you're talking about our own domestic situation, too.

Ronnie Coffman

Yeah. Well, you think about our domestic situation and our ability to respond, say, to a demand, and that's changed a lot as well, the kind of faculty and staff that's there, that we have in our universities are very different.

Peter McPherson

Olive, do I see your hand up here?

Olive Mugenda

Yes, I was going to say that I'm not sure about other countries, but in Kenya we even have a bigger problem of interesting people to take agriculture. We are finding that there's a decline of students wanting to get into agriculture, and you have to find ways of making sure that we get the students to study agriculture.

And what I've been thinking is that – and I think this was said earlier – are we able to mainstream agriculture, you know, in our educational system, so that the children in primary school are taught agriculture, secondary school, and then university? I was talking to a colleague last week who said that a university student joined the school of agriculture, and the first question the student asked the professor is: What is agriculture? They have no clue what it's all about, so I think we need to do something about that.

And maybe if I can just say something about extension. I think we also need to train professional extension workers. We tend to get people from other professions and then ask them to do agricultural-extension work. I think we need to train them properly. And we also need to make sure that the research we are doing at the universities – I get concerned about the kind of research we are doing, Peter, because if you look at the researchers, and I review quite a few of them, they are not connected to results that we need. They are not targeted to actual variables on the ground. And I think we need to change the direction of that.

Peter McPherson

Greg?

Greg Geoffroy

Peter, I want to follow up on your comment about the need for more young people pursuing careers in agriculture and the food sciences. We're very proud of the fact that President Mugenda is one of our alumni and also that her daughter is currently one of our students.

Peter McPherson

Is that right?

Greg Geoffroy

That's correct. And it's a very important connection. But as you indicated and as we have seen at Iowa State University, over the last decade or so, up until just recently, student interest in agriculture programs has been slowly declining. But in the last several years, that has been completely reversed, and we're seeing a significant interest in young people in pursuing careers and in research in agriculture and related areas.

It's stimulated by the food-price crisis that has been alluded to, but it's also been strongly stimulated by the interest in using plants for a variety of things – fuels, food, other products. And overall I think that is extremely healthy for the world. Anything that happens to raise agriculture to a higher level of interest and prestige eventually will help solve these critical problems, particularly related to food.

Peter McPherson

I used to think of my agriculture college at Michigan State in some ways being more of a science college than agriculture. You get a real shift, don't you?

Greg Geoffroy

That's correct.

Peter McPherson

Monty.

Monty Jones

I would add to that the science-and-technology generation have done quite a lot for Africa, if you look at it, in various sectors – in agriculture, in transport, in communication, in energy, various fields. And if we look at agriculture as a development in Africa, true science, it has gone through tremendous transformation. Because today, compared to 500 years ago, several hundred years ago, we've got crops that are alien to the continent of Africa. Like barley, like wheat, like maize, and even rice and apples and tomatoes. You know, that was not cultivated in Africa before, but today they've

been adapted and they are widely cultivated in Africa. And I think that, in that regard, we have made tremendous strides. Science and technology is doing very well.

And coming to recent years, you look at quite a number of Africans who have come up with incredible technologies through agricultural research. And I think one of the major problems that we face is how to get these materials out there to the farmers so that they are utilized and utilized properly? And how do we organize the farmers so that they can receive appropriate information about the technologies, you know, so that they can appropriately adopt this new technology for optimum yields? That has been the problem that we have been encountering.

And I think you look at it – if I could take this back to acquisition of knowledge, which I personally feel it's very important. Such knowledge should come from research, it should come from the university, it should come from your education. And how we get farmers that are, predominately, very well-learned, but do not have access to that information, do not have access to that knowledge.

Until we are able to build knowledge, we cannot talk of economic growth; because when you build knowledge, then you can help, you can use that knowledge to solve your problems, and then you can use that knowledge to improve your well-being, improve the well-being of your community – and that will translate to economic growth.

But, Peter, one thing that I want to mention, and I think it's really very worrying, is the quality of education that we get in Africa. We've seen tremendous increase in the number of universities in Africa, from the days before the independence era in the '60s we have just twelve universities. Today, we're talking of 250 universities.

Funding and investment in universities have gone down considerably. In the last two decades it has almost remained stagnant. And so the quality of our education has gone down considerably. And one of the major challenges that we face in Africa today is – how do we bring up this quality again? And it is why we're looking at our colleagues outside Africa to the west and to the international centers, so that they can help to improve this quality.

Peter McPherson

Let me ask Olive, the line administrator of a big university – in Africa student population is doubling about every five years. If Cornell had doubled every five years for three 5-year periods, it wouldn't quite be Cornell, would it? So that's what African universities are facing – doubling every five years. Don't have enough professors, don't have libraries. Now, we want to have these partnerships with U.S. universities. Can you, Olive, what do you think we should be doing?

Olive Mugenda

You're right, Peter. The numbers are doubling. In fact, in my university just five years ago, we were 10,000, and now we are 23,000 students. But I think the quality doesn't have to be affected just because the university is increasing. I think if you also hire the professors and make sure that you get the infrastructure right, we can still have the quality good, even with the numbers.

But we have to have a ceiling. I mean, we can't go on doubling. What I think we need to do as universities is determine, in our strategic plan, determine a ceiling. Like, I think, Iowa State

University – President Geoffroy, I think there's a number that you know you can't go beyond in terms of your plans. And I think and once we get to that number, then we stop and refocus...

Peter McPherson

Can you see a massive effort, partnerships with U.S. universities and European universities, perhaps, to help train those, not in America but there, through the Web and through some work like that?

Olive Mugenda

Yes. The partnerships – especially in training – really can help a lot. In fact, we've talking to some of the government partners how, for example, that training can be done within the countries so that, for example, we get assistance in supervision, we get split programs where staff don't have to leave the country. And I think if we go that way, then the building of the capacity will be good.

What is happening right now is that a lot of students, when they leave, especially when they come to this country, Peter, then they don't come back. And we are worried about that. Of course, they have the right to work where they want, but we have a program where we send them and then they don't come back. And so the partnerships for supervision of students and for training are very, very helpful. And also for research.

Peter McPherson

Let me jump to one last question, change subjects a little bit, and then we'll have several minutes, actually, with the audience, and you can all jump in and have the questions.

Let's talk about the international, about the CGIAR system. How do we, the U.S. universities, get better linked with the system – and perhaps you, also, with the IARCs and with the universities in Africa – unless some portion of the individual center's budget is set aside for competition to do that?

Ren Wang

Okay. Well, obviously, I should take up the question – you're making a point, right? Okay, thank you, Peter.

Peter McPherson

I thought this was a great opportunity...

Ren Wang

Let me not try to answer the budget question first. I'd like to broaden the question a little bit. First, let's look at the partnership issue. And my opening statement would be one like this. I would say, first of all, we have to realize that international agricultural research centers, I mean, particularly the CGIAR-sponsored centers, cannot be held accountable for the end result or the impact their research extends to.

What does that mean? People ask, “What do you mean you’re not going to be held accountable?” This is not my statement; this is a statement of a distinguished panel of the independent review of the CGIAR system, which was just completed last month. Okay, this distinguished panel, chaired by Elizabeth McAllister, and this is one of their findings or statements.

If you think, it makes a lot of sense, because the CGIAR centers or CGIAR is only a small part of this global research-for-development continuum. The total budget of the CGIAR today represents 1.5 percent – 1.5 percent – of the global investment money for agricultural R&D.

And also for many years there has been a constant topic of debate to, say, should a CGIAR use this little, small portion of the global investment, in upstream research or downstream research? Well, that has implications for its partnerships with universities, for instance.

Peter McPherson

Right.

Wang

Well, in my view it is not an accurate description of the strategy or the direction of the CGIAR for its research agenda. Because really an accurate description should be whether or not the CGIAR research is linked or oriented towards development targets.

So in our view, now, the CGIAR is making an effort now. It’s, first of all, let’s sharpen our focus. We now have agreed that we’re going to focus on three areas: productivity and production; environment, natural resource management; and the institutional innovation and policies.

And then let’s identify, working with partners – in national programs and universities and regional organizations – to identify the development targets. A very interesting example is not really done by CGIAR but initiated, actually, by the government of Japan and also AGRA. They identified the target for doubling the rice production in sub-Saharan Africa in the next 10 years. The [inaudible] is in the core of that. Let me just say that that is a development target.

Can the CGIAR centers and the universities, let’s say Cornell, UC-Davis – working together to identify them – what are the technologies and research that we can do to contribute to that development target? That’s the kind of a mission-oriented call. I think that’s what we should be working together. And we can do a lot of things together and grow.

QUESTION AND ANSWER SESSION

McPherson Let me now open up the field here. The international system is clearly the largest concentration and provides huge leadership to agriculture research for the world. And guys like Ronnie and I have been long, long supporters of this back when I was at AID and he was doing the things he was doing over the years. We’re very supportive of this discussion and possibly forming undertaking, and it is my hope the U.S. government gets in the business of providing real money like we used to, to this effort.

We've got 25 minutes, is that right? We've 25 minutes, so we want to have you get up, go ask your questions, identify who you are, who you're with, of course. And the panel here, we'd like a lively discussion, so don't be easy on us.

Yes, sir. It's no fun if you're too easy; no softballs.

Question I don't think this will be easy. Well, the issue of linking education to extension to research... I am Adel El-Beltagy; I'm the chair-elect of the Global Forum of Agricultural Research. It's a forum which was created 10 years ago to enhance the linkages of all the partners in agricultural research for development to make a difference for the livelihood of the people and fulfilling the targets which we all working for.

Therefore, the issue here which we have in this session, as all the colleagues have been talking about, it's not a matter of working in parallel or sequential. It's a matter of how to optimize these linkages effectively and minimize the barriers. There's a lot of good models and examples and good success stories, but this is not really scaled-up enough to bear the foods down, as mentioned by Monty and others, and Ronnie Coffman, and other colleagues on the panel.

But the issue here is, how can we optimize these linkages? The issue is very important. A lot of scientists in Africa, because they are not connected, they advise their policymakers not to deal with certain technology and certain knowledge coming from advanced science, because they are not partners to it and they don't have links with it. And therefore we need to enhance the linkages; we need to optimize all the conduits which will end up to innovations and end up by making a difference. Thank you.

McPherson Comments?

Coffman Peter, we have an example of an outstanding partnership with the University of Ghana at Legon, for the West Africa Center for Crop Improvement. And the director, Dr. Eric Danquah, is in the audience. I wonder if he'd comment about what we call WACCI. Eric, are you out there? Could you just describe – you need a microphone, I think.

Eric Danquah Thanks, Ronnie, for asking me to make a comment on WACCI. The West Africa Center for Crop Improvement is initiated between Cornell University and the University of Ghana to train plant breeders for West Africa, in West Africa.

Let me say this initiative is funded by AGRA. I believe we have heard about AGRA this morning. Thanks to the Bill & Melinda Gates and Rockefeller foundations, we have AGRA, which has invested in a number of areas in West Africa – and Africa in general.

In WACCI, what we are doing is, we admit students from Niger, Mali, Burkina Faso, Nigeria, and Ghana and take them through a five-year PhD program. They do the first two years in the University of Ghana and return to their home countries to

undertake thesis research, and they return to the University of Ghana during the last quarter to submit their thesis.

Let me say: this whole partnership was started two years ago when we teamed up with faculty from Cornell University, and I must say that it is a living example of one of the good partnerships which is developing capacity in West Africa for West Africa.

This morning I have attended a meeting that was a symposium by the Partnership to Cut Hunger in Africa. We're talking about brain drain, brain circulation. I doubt that "brain circulation" will address the problems that confront us in Africa today.

What we need to do is to build capacity in Africa to address Africa's problems. And I think that this link with Cornell University is doing a lot of good. What happens is that we have faculty from Cornell who come to live in the University of Ghana for a total of six months, a year, to help in teaching and mentoring of PhD students.

I must say that in the past, a number of Africans have worked on foreign problems and have never been encouraged to return; because of course when you work on the foreign program, I mean you would not be much better at all to go back to Africa.

What we are doing at WACCI, I think is one of the living examples. And there is a parallel program at KwaZulu-Natal, where plant breeders are being trained for Africa. But I should say –

McPherson I've got to get...

Eric Danquah Just one second to wind up. I should say that what we really need to do is to look at some of these models and see how we can strengthen them to build capacity in Africa.

McPherson Thank you, thank you.

Jones I agree with Adel that partnership is really very important, and I think that last week I just talked their model in developing partnership.

And I think that the African political leaders realize that this is the way forward for Africa. And the reason why I believe they created NEPAD, to help drive the development process. And NEPAD in itself, recognizing the important role of agriculture in the development process, developed CAADP, the Comprehensive African Agricultural Development Program, which is a document that spells out the strategies and outlines the goals and objectives for agricultural development, for which capacity-strengthening is a key in that process and for which, again, all of us within Africa are organizing ourselves to respond to that common agenda – creating partnerships with the AU, political bodies like the AU, and the regional economic communities, but coming down to creating partnerships with research entities, extension, NGO groups, you know, all coming together.

And it's in light of that that we approach American friends for support to build higher education, to help promote higher-education collaboration with our American colleagues. And in the same light, we also are partnering with development partners, a partnership with NATURA in Europe, linking us to 34 universities in Europe. And I think that this is the only way forward, because Africa cannot work in isolation. Africa needs the international community to help put its act together, to revive its economies, and to promote livelihood and food security on the continent.

McPherson Let me ask for another question from the floor. Other questions?

Question My question is regarding how to motivate and encourage more international cooperation and research – particularly in the area of, how to enable more equitable access to the intellectual property that would come out of that research? There's so much potential with the new germplasm development, particularly those that would be linking with, let's say, African centers of excellence and knowledge and plant materials, with U.S. centers of analysis, and genomic sequencing, etc. But how would you enable the proper sort of allocation or equal access to the intellectual property that would come out of that kind of collaborative environment, whether it's patent pools or other kinds of models?

McPherson Dr. Wang, if you would, please.

Wang Thank you. That's a very good question. And perhaps what I would like to say is to actually take this opportunity to just make a few remarks about what Gordon was alluding to: reform of CGIAR. We now have a concrete proposal put on the table in front of the world – and actually it's still being finalized, but it is a proposal – to say that we would like to open up the system, leaving out accurate word again, but to more effectively mobilize the best of science for development and mobilize innovative partnerships.

How are we going to do it? We are proposing to establish, first of all, a legalized consortium of international centers, and then to establish a new CGIAR fund – so that you could hopefully envisage that we are trying to separate the doers from the donors. And then the linkage between the two will be a strategy, a results-management framework, developed by the new consortium of centers, and with the input and advice from an independent science and partnership council and also the partners like with GFAR, the Global Forum for Agricultural Research.

And one of the important elements is for this new fund to allocate a funding through smaller, sort of big-funding windows, and also what we might call it big or thematic mega-programs.

One of the windows could be specifically targeted towards funding the CGIAR centers for their capacity, such as maintaining the gene banks. And the other windows might be oriented towards the three strategic objectives I just mentioned.

And then out of each mega-program, or thematic program, we are now thinking of making a special allocation of funding specifically for mobilizing science through

partners. So other institutions may come in to compete, for instance, towards a commonly agreed research agenda.

So that's what we have now. I hope that properly ends the question there, but perhaps more broadly just to take an opportunity to introduce what we are doing.

McPherson Yeah, I think that's very helpful. I think in the end competition for dollars really, or Euros, or whatever they are, keeps everybody on their toes and drives the agenda. Greg, you had a comment.

Geoffroy Peter, one observation that I have made just from my limited experience in working with institutions in Uganda is that, first of all, our faculty at Iowa State University, when they see the exciting challenges in agriculture and development that exist in Africa, they get very energized, and they truly want to partner and help and find solutions. And particularly, they're interested in partnering with African universities to help build their capacity and infrastructure.

One issue is – who pays for it? Because if you're going to have exchange programs and cooperative interactions, you do need resources for that to occur. Those resources are hard to come by in many areas right now.

We have at Iowa State a world-class distance-education program offering a Master's in agronomy, the only one that I know of that's fully online, and it is truly spectacular. But for anyone around the world to enroll in that program, they have to pay the tuition, and that becomes a problem in some parts of the world. So it is a great program to do what you said, to deliver the expertise that we have in agronomy to universities in Africa. But who will fund the tuition?

McPherson What I'm beginning to wonder about, though, is – Can we use that program, plus some travel, to arrange tools to help augment Olive's faculty? I mean, I think that there are just too many students – mean, what's your – there are 3.6 million undergraduate students in sub-Saharan Africa as of 2005. There are, of course, hundreds of thousands of faculty, a couple hundred thousand, I guess, and the question is, could there be some distance education? That assumes connectivity, too, of course. Olive, please go into how we can be helpful in this whole massive faculty education, because Greg's right – there's a lot of software out there.

Mugenda Yeah, I think as the president has said, Iowa State is quite expensive, but I think if we can use the economies of scale, and use that to bring the cost down. The distance-education program we have in my university, we call it “open learning,” is registering so many students because it's cheaper, than the regular degree. And because we are seeing that many students out there, we are using the economies of scale and reducing the cost. So I think that is the way to go, to reduce the cost so that many people can enroll.

But I also, Peter, wanted to talk about the memorandum of agreements that the universities are signing, the African universities and the U.S. universities in other countries. I think we also need to focus on those ones, because I've seen many

where people are signing, and maybe the details are not worked out properly, and then things don't work out. For example, who – the issues of intellectual property, are they addressed properly? The issue of publications? And we need to address those ones – how do we do the MOUs? Are they clear, so that misunderstanding doesn't come up? Because it can affect partnerships also.

McPherson When we spoke of curriculum software, courseware, I think one of the matters that we all need to be particularly sensitive of, and I know Greg is, is that this curriculum has to be driven by African needs and will be separate and unique, in many cases. For example, Greg, I know that you've thought if you were to teach agronomy courses, some of the biomass issues are different in various parts of the world. So other questions, comments? 10 minutes more, we've got. Yes, sir.

Question Allen Christensen, the Ezra Benson Institute. One of the things that my generation of agricultural scientists had as a background, we came from small farms. Those small farms have largely disappeared, and the large corporate farms that we knew in California have not been sending their sons into agriculture – or their daughters. They've been sending them to Harvard and to Stanford, to the business schools to get MBAs.

If we're looking for a truly cooperative partnership, why not get the land-grant system and the agribusiness firms to provide assistantships, fellowships, that would draw American students out of the chemistry, biochemistry, and microbiology departments into agricultural graduate degrees, since we don't seem to have near as many of those students that we used to, to avoid the brain-drain out of Africa and other places to staff America's colleges of agriculture?

McPherson Okay. Comments? Greg.

Geoffroy Well, we do have some terrific partnerships with Monsanto and Pioneer, in each case supporting graduate students at Iowa State University doing exactly what was just suggested, working jointly with the private sector.

Coffman Well, you know, I think it's a question of looking at our comparative advantages and looking at technology to link us so that we can draw on those comparative advantages, such as, for instance, we have tremendous library resources in this country in our universities. You don't have to reinvent that, and you can just create access to it, as far as Africa's concerned, it seems to me.

There are other kinds of comparative advantages that we really should try to exploit, but as many people have said, what you need to end up with is people who are trained in the environment in which they are going to work. It doesn't work, as you pointed out, to send people here. And I'm not sure it works to have an online course to learn agronomy at Iowa State University or Cornell, or wherever. It might depend on how it's configured.

I think, you know, there are as somebody pointed out, many universities producing a large number of students. We should also think, how can we take advantage of that?

Could we design some kind of capstone degree that would take what might be a reasonable general education and add the specificity that might be needed? For instance, at Cornell we have something called a Masters of Professional Studies that you can design specifically for what you need, and you can do it in a year. And that's become very popular in India, where we have a couple of new dual degrees, one in food science and one in plant breeding, working with Tamil Nadu Agricultural University, and they're very enthusiastic about it.

McPherson Well, let me just report to all that this U.S.-Africa Higher Education Initiative that the U.S. academic community has really put together, with the big public universities driving it – but it's very much of a community-colleges/private/publics effort – has an e-consultation page that's been going on for a couple weeks, will go on for three more weeks, that you can tie onto the NASULGC website. It is, I think, there are like 700 people that are registered to participate, more people every day, lots of activity. There is \$1 million grant that AID has given HED with NASULGC to, there will be 50,000 little planning grants – \$50,000 a grant, which really doesn't get you a lot of money, except to plan for an African university and one or two U.S. universities. And our hope is – out of it will come a lot of ideas, like Dr. Coffman has just talked about.

I guess we're about out of time. We've got about three minutes. Did you have a quick question?

Question Well, I don't know if it's quick or not, but my name is Berna Magnuson. I'm from Cantox Health Sciences, and I'm here actually representing the Institute for Food Technologists. I think it's been very interesting to talk about trying to get students from other disciplines to pull them into food science, and that's definitely what we find a lot in food science.

But I'd just like to ask the question of trying to raise awareness of these disciplines at the high-school level and not trying to wait until we have students already enrolled in university in some program and then trying to switch them over.

I've taught food science, introductory food science, and to me it's just amazing that students are coming out of high school with phenomenal skills in computer technology and mathematics, yet they don't have a clue about what food is. And I think that has been really – of course, I come from home economics; home economics is old and dead, and it's not in the schools. And I think that's kind of a question I think our students don't know and are not aware of these issues until they get into university.

Geoffroy Peter, can I just answer that very quickly. I agree very, very strongly with the argument made by the individuals that colleges of agriculture must be much more aggressive in carrying their message out that, these days, education and research in agriculture is so, so much more than just farming. It's a very broad life-science discipline, food science, feeding the world...

McPherson Nutrition.

Geoffroy Nutrition. Our college has been very effective in doing that here in Iowa, carrying the message across the state, and that has had the result of growing enrollments in our College of Agriculture and Life Sciences. We changed the name in part to reflect that.

McPherson Okay, Doctor, you've got the last word.

Wang Thank you very much. Very, very quick, I'd just like to bring up a special point. That is coming back to the point I was making for a global campaign for the development of next-generation of agricultural scientists. And I think that we should give special attention and effort to development and capacity building of women scientists, particularly in the African context.

I have to bring to your attention that the Bill and Melinda Gates Foundation really is doing a great job in funding a program out of CGIAR called "AWARD." It's African Women in Agricultural Research for Development. It's a fantastic program; it's personalized tutoring on the capacity-building for women and the development of women leaders for the future. And I was thinking I should make a recommendation to Ambassador Ken Quinn that maybe next year during the World Food Prize symposium we should invite this AWARD program to make a special presentation. You will be astonished to what they are achieving there.

McPherson I can tell you Ambassador Quinn is a particularly able and good listener. That's our conclusion. Gordon, are we through? Thank you very much.

Gordon Conway

Thank you, Peter, and thank you, panel, for that very fascinating conversation. I'm one of those people that collects killer facts. It's largely because I deal with politicians. And I've got a list of them here. You can save the corn gene forever for \$35 million. The CGIAR is only 1.5 percent of the global R&D. USAID is only training or funding the training of a thousand people a year these days. There's not a plant breeder under 50 in Indonesia. Sub-Saharan Africa's electricity is about the same as Spain.

And my final one is – President Mugenda was a student at Iowa State. I have a very soft spot for Kenyatta University because one of the students there painted my portrait – right? – and the student had never met me. And this is a great advantage if you want to get your portrait painted. I think the student had got a photograph, so I turned out looking much better than I really do. And so Kenyatta, they've got bright students at Kenyatta University.