

**2006 Norman E. Borlaug/World Food Prize International Symposium**  
*The Green Revolution Redux:*  
*Can We Replicate the Single Greatest Period of Food Production in All Human History?*  
October 19-20, 2006 - Des Moines, Iowa

**SESSION FOUR: Looking to the Future**

October 20, 2006 – 9:00 – 11:50 a.m.

Pedro Sanchez

*Moderator*

**Gordon Conway**

---

Now our third speaker this morning in many ways needs no introduction to this audience because he was the 2002 the World Food Prize winner, which he gained for his pioneering work in integrated nutrient management. As many of you know, he's been a professor at North Carolina State University. He's worked in Latin America on soil nutrients, did pioneering work there, and then was Director General of the World Agroforestry Center in Nairobi.

And he's now back in the States where he's at the Earth Institute at Columbia where he's working with Jeffrey Sachs. And he is now the Director of the Millennium Village Project, and that I think is what he's going to be talking about. Pedro.

---

***The African Green Revolution Takes Off: A Progress Report***

**Pedro Sanchez**

Director, Tropical Agriculture, Earth Institute at Columbia University  
Co-Chair, U.N. Millennium Project Task Force on Hunger  
2002 World Food Prize Laureate

---

Thanks, thanks, very much, Gordon. Ever since I was a Laureate in 2002, Kenneth Quinn asked me to basically do an annual progress report of what's going on with the Millennium Project, the Hunger Task Force and so on. And 2003 was actually the symposium that tackled this issue. In 2004 my co-chair, M. S. Swaminathan, presented a progress report. In 2005 I did, and now this one I put a daring title – “The African Green Revolution Takes Off.”

But I think this is actually a kind of a meek title compared to what we have been hearing around here. I think as Josette Sheeran said yesterday at lunch, we're reaching a tipping point. All the speeches we heard about Africa, starting from the Wednesday morning BIFAD symposium, the ambassadors' speeches; all sorts of speeches are showing that this is really the case – we're reaching the tipping point.

And what she said yesterday was very important. This country – and maybe many countries – we have this perverse addiction to bad news. We feed on bad news – until a tipping point is reached in which we say it can be done, let's do it. And then it becomes a bandwagon. She used a term I forgot, but it becomes a bandwagon. And we may be there.

So I'd like to give you a report.

I want to talk about the 21<sup>st</sup> century African Green Revolution that was launched as a major call to the world by Secretary General Kofi Annan at a meeting of African Union presidents on July 5<sup>th</sup>, 2004, in Abuja. This was called by the Secretary General, and the previous call he made like that was in Nigeria 2001, saying, "Let's get serious about AIDS in Africa." And the world did get serious about AIDS in Africa. Likewise, I think the world is getting serious, very serious about what he calls a 21<sup>st</sup> century African Green Revolution.

Let's remind ourselves that the latest number is actually 815 million people who are very hungry, who do not know where their next meal is really coming from; that 92% of this 815 million people are the chronically hungry people. They are the people who do not starve to death. They are the people who die in droves of malnutrition-related diseases. These are the chronically hungry as opposed to the 8% who are the acutely hungry. These are the people who are victims of extreme events, of famines and wars. Darfur right now is the example of that.

We must separate these two kinds of hunger in the developing world, and we must realize that over 90% of it is the chronic, the silent hunger that doesn't hit the headlines. It's not the Ethiopian child with flies in his eyes, dying in his mother's arms. Horrible as it is, that only represents less than 10% of the hunger in the world.

But our foreign aid has been actually backwards. A major donor in Ethiopia in 2003 has spent \$5 million for fighting chronic malnutrition and \$400 million for acute hunger. Somehow we got it out of balance.

What I'm going to talk about here is that – focusing on the chronically hungry. By all means, food needs to be maintained for that 8 or so percent of the acutely hungry when it happens, but the rest, it takes a different strategy.

Kofi Annan's call for a uniquely African Green Revolution for the 21<sup>st</sup> century has six major components. It has agricultural increase, like the previous Green Revolution but starting with solving the problems of soils and water – of unhealthy soils, basically nutrient-depleting soils, and too much or too little water, unclean water, and focusing on scale water management. And then indeed focusing on improved crop varieties, including transgenics by whatever means and revitalizing extension services and other things of that ilk.

But it also focuses on human nutrition. That's one thing I learned – it's one thing to produce food, but the other one is to get it in the quantities and the qualities. And as a soil scientist, what I call micronutrients are very different from what the nutritionists call micronutrients – vitamin A, zinc, iodine, iron, foliates. They're different.

It focuses on making markets work for the poor, but realizing that most of those people are not even in the markets. They're not affected one way or another by markets because they have nothing to buy or to sell. First they have to be lifted out of this poverty trap, this big hole, before they get into market. But once they get into market, then markets must be made for the poor. And a lot of effort, a lot of progress is going this direction.

It also focuses on the environment. We know how to do things better than many years ago. We know the excesses of nutrient pollution that have taken place. We know how to handle that. We know how to use different techniques for improving the soil resource base, sequestering more carbon, saving biodiversity, and so on. Greenpeace cannot be opposed to this stuff.

It also focuses on policies, that whatever you do at the local level, it has to have enabling policies, and those are policies at the government level. And of course it focuses also on politics.

But this Green Revolution that Kofi Annan called for – and by the way, this was his term – a uniquely African Green Revolution for the 21<sup>st</sup> century. It's the same thing as the Doubly Green Revolution proposed by Gordon Conway in his seminal book published many years ago. It's the same as the Evergreen Revolution that M. S. Swaminathan has proposed, and many other ones. It's basically the same idea. He chose the terms.

Now yesterday I got a very good compliment from Ken Quinn. Hans Herren and I were called by Ken – we are the “controversial laureates.” And I think that's a tremendous compliment, because people like Borlaug, Swaminathan, Subramanian, Chandler, Havener and all that, and those kind of people during the original Green Revolution were highly controversial and highly confrontational.

The year I got the Prize here, a bunch of people from the Hunger Task Force and ICRAF had a couple of beers at our suite with Norman and his people. And we asked Norman Borlaug, “Really, how did you do it – besides all the public utterances?” And he clearly said two things: One, set the grassroots on fire. Set the grassroots on fire. And the other on, push the politicians to the wall. Those are the two things that Norman told us, and I think they're so true. I'm trying to practice it.

But we talk a lot about the interactions between India and China and Africa, and they're incredibly important lessons because of the Asian Green Revolution. But I want to tell you that there's a major interaction also between the Cerrado, Brazil, specifically – and there's a picture of Edson when he was a lot younger when we were working at the Brazilian Cerrado Center – basically the knowledge that we have gained in the Cerrado, Brazil have been central to lift Africa out of incredibly low yields because the basic concepts on how to manage tropical soils were really developed there. So there's a tremendous debt of gratitude that we owe to Brazil from the African side as well.

On Wednesday Ousmane Badiane showed this graph – this is per capita food production in Africa relative going down, down, down, but it's the first time I've seen it going up. It's beginning to go up. It's still not quite at the level it was in 1961 per capita, but it is going up and going up significantly. So the trend has been reversed. It's still awful, but the trend has been reversed.

So now what's happening after all sorts of that is I'll describe work at three different scales: the global, the national, and the community scale.

And the global scale this year – this is my report now – this year has been a lot of progress. The Millennium Development Goals are widely accepted. They're increasing momentum. It's happening more and more. It's even been heard in the United States by government officials, ever since President Bush last September mentioned them at the General Assembly before they really were even mentioned. So this is a great, great progress.

The African Green Revolution is definitely on. Agriculture is back in the donors' agenda. But I'm distressed to hear that in the case of USAID the appropriations for next year will not increase the agricultural budget, as Tom Hobgood told us yesterday.

Things like soil health, small-scale water management are now mainstream, and ten years ago or so there were a few nuts crying in the wilderness, saying this is very important, including Norman Borlaug. But nobody was listening. Now it's getting mainstreaming.

The transgenic crops are becoming acceptable in Africa. I think the battle has been won. Large-scale distribution, on the health side, of long-lasting insecticide-impregnated malaria bed nets, and anti-retroviral drugs for fighting AIDS – it's happening. There is a similar health revolution taking place.

And the grassroots are really getting involved. It's amazing that this issue is no longer the domain of scientists and government officials and so on. The churches in this country of different denominations, and especially the more fundamentalist churches, are beginning to say, "Hey, world hunger and poverty is morally unacceptable." And in many ways, this issue is larger than issues such as gay marriage and stuff like that.

The youth are getting involved. Young people here are a lot more serious now than they were generations ago, and they are raising money, they're doing caucuses. Of course, here the Youth Institute is a perfect example of that. But the youth are getting involved here. It's not the me-me generations, or it's not the sixties generations, drug-driven. This youth is serious.

The celebrities are getting involved for the better. So people that we, especially young people, admire, because they're movie stars and so on, are now working – people like Bono and Angelina Jolie and Madonna and all that. So instead of being known for another marital scandal, now they're being also known for joining this. This is different. The media is also getting more seriously involved into it. So I think there is a sea change. Maybe this is a tipping point. Things are changing. People are serious about this.

Private philanthropy with major funding is really leading the way – and this was mentioned yesterday by Peter McPherson and others. And the hundred million dollars pledged by the Rockefeller Foundation and the Gates Foundation for the Africa Green Revolution specifically is also supplemented by an additional \$50 million delivered from the Soros Foundation, and additional \$50 million from other private philanthropists. These, we're getting at the level of funding at scale. And they're coming, and they've been driven by the private philanthropic sector in this country and in Europe.

The private sector is also becoming a full partner. In other words, I'm not talking about the philanthropist, I'm talking about the businessman. The World Economic Forum in Davos created a Business Coalition Against Hunger earlier this year, and it's run by the CEOs of major companies, like Unilever, Monsanto, D&T and other ones there, to really partner in a way that they make money but to really work across the food chain.

In the lower area you see my colleague, Akina Dasina from the Rockefeller Foundation, one of the drivers, one of the key players in the African Green Revolution, and myself freezing to death in Switzerland, coming straight from Africa. But it's working. The Business Coalition Against Hunger is tackling one district in Kenya to start with – and it's working.

We still are faced with a bunch of paradoxes, though, in spite of all this progress that I'm reporting to you. The donor country commitments have been reinstated time and time again, but delivery is lagging. It's one thing for the prime minister or the president to say, "We're going to do this," and another one for the agencies to receive the money to get it done. There is a disconnect there.

There is also a philosophical disconnect. Some agencies really are focusing on market-based development, which is fine. But they forget that first many of these people are not even in the market. So they first have to get out of the poverty traps. They need to be helped with investments to get out of that before they can enter the markets and take advantage of the positive market forces.

There's been some debate in some countries that small farmers in Africa are not viable and the best thing is to send its people to be maids and cooks in the Gulf and in Dubai and places like that, now that the Filipinos and all the cooks and maids are returning to their countries because they're getting rich. This is nonsense. The Asian Green Revolution started with the better farmers, yeah, but it quickly became scale-neutral. And farm size does not change a nation. And Asia is a powerhouse of development, as we see right now. These are exactly the people that we have to continue to work with – and they respond.

Another paradox is subsidies for the rich versus no subsidies for the poor. As we know, we subsidize our farmers in the U.S., Europe and Japan to the tune of a billion dollars a day. But for somehow, many of our agencies are absolutely allergic to subsidizing the smallest farmers in the world. This is a real disconnect.

"Land expansion is not possible. Everything has to be increasing yields." As you will see a little bit later, that is not necessarily true. And the paradigm shift that is really needed in investing at the front end of the food chain versus investing at the tail end of the food chain. What do I mean by that? We have the food chain there – soil, water, seeds, crops, harvest the product, market processing, supermarkets, eating, etc. What we have found out in Malawi, what FAO has found out in Malawi for this year is that if you invest at the tune of \$40 per family in Malawi in subsidized fertilizer, in subsidized small-scale water management equipment, in subsidized hybrid seed, that is effective – that costs \$40 to do that. If you were going to feed that family with food aid, it will cost you \$400. So I think we have to look at real efficiencies.

So there are changes that are coming and are needed in the developing paradigm. One is real investments on the ground that directly affect the farmers in the poorer villages versus feeding the development establishments. Right now 65% of what we call aid is used to support people like me, pay my salaries, and support many of you here who are in universities and research institutions. And only one-third really goes to the farmers. I'm all for supporting people like me – we need science and technology and so on. But I think the balance of two-thirds to one-third needs a little bit of thinking.

Coming to grips with food aid versus food security. Countries are beginning to have MDG-based budgets. Markets are beginning, through a couple of very clear techniques, functioning for the poor. We've got to fix infrastructure, once and for all, and invest at scale and for the long run. The bottom line of all this is that if this is going to be sustainable, if it's really going to be a successful Green Revolution in Africa, it's the economic transformation from sub-subsistence farming – because we cannot even call this subsistence – from sub-subsistence farming into small-scale rural entrepreneurs.

There are other things that have happened. The Africa Fertilizer Summit in Abuja this past July made a commitment of the presence of Africa that fertilizers, both inorganic and organic, are a strategic commodity. And their response being developed by the African Development Bank and by the World Bank is that fertilizer financing facility to facilitate improvements of fertilizer procuring and distribution.

Agrodealers, at the bottom, it's been a tremendous innovation, spearheaded by the Rockefeller Foundation. This is changing the people in little stores who sell you a Fanta or a pack of cigarettes into being trained to sell fertilizers and seeds and implements.

Finally, there is something similar to the World Food Prize that has arisen in Europe, which is called the Oslo Conference. It's an annual conference now supported also by the private sector, by the Yara Foundation, Yara Fertilizer Company, the largest fertilizer company in the world. And they have given an annual African Green Revolution Prize. It's a little lower than this one. It's \$200,000. But this year it was awarded. Norman Borlaug gave the award to two NGO activists who have been involved in this – one from Kenya, shown there, Fidelis Wainana, and another one from Mozambique (Celina Cossa).

And in the Central Plaza of Oslo, there was this big parapet there. I don't know if you can see very well. It's about three stories high. Talking about saying African Green Revolution and with local singers and so on. So it's great to see in a European capital also something akin to what Iowa is doing here.

At the national scale, there's a Green Revolution going in Malawi. Gordon Conway mentioned yesterday you've got to deal with ministers of finance, and, Gordon, you're absolutely right. And my colleague, Jeff Sachs, and a bunch of us were dealing with the Minister of Finance of Malawi, Minister Gondwe. And they said, "Well, Malawi goes up and down, up and down all the time – peace and famine." There are droughts in Malawi that come from time to time, but there is a perennial nitrogen draught in Malawi that prevents any real increases in food production when the rains are good.

So in 2005 the government of Malawi decided to put a 75% subsidy for hybrid maize and for fertilizers. They subsidized 147,000 tons of fertilizers and 600,000 tons of improved maize at a cost of \$50 million. Most of that came out of the pockets, because many donors were not interested. Now some enlightened donors are contributing, I believe, this year, not 2005, \$50 million, and I'm glad to say DFID is one of them. The other ones are Norway, the European Union, and UNDP.

What happened with that fertilizer subsidy and the crop that was harvested this year in April in Malawi? The rains were good, thank goodness – maize production doubled nationwide, from 1.3 to 2.61 million tons. And not due to any land expansion but due to yields doubling from 0.8 to 1.6 tons per hectare.

The policy, very much debated, has continued. The president has made the commitment to continue for the planting season that's starting now. The challenge is – and most of those input subsidies have to be done through the private agrodealers, and there's still a lot of that is going through a public parastatal, and that's not the way to go – it's through the public agrodealer. That's a challenge that several of us are working on, including Norm.

Ethiopia. In spite of all the things that you said about Ethiopia, Ethiopia has done remarkably well. Ethiopia has doubled its cereal and pulses production in the last ten years. And the plan is that, from 2005 to 2010, they're going to double it again. The news came out now that in the expected harvest for 2006, it's 23.2 million tons, again, grains and pulses, while the 2010 target is 24. So Prime Minister Meles is very helpful. He says we're going to exceed these targets; we're going to do it early.

Why? They have developed many innovative techniques. One is to train, hire professional agricultural extension and community health workers, five of them in every village. Now, these are people without a college degree or even maybe a high school degree. They go back to the village and they're there, with the very basic, simplest knowledge. This is sort of like the barefoot-doctor-type approach. And they work, and they're supported by the National Extension Services. And the access to market is certainly improving.

Government, industry, the U.N., are working together. This was last month in New York. President Kikwete of Tanzania and some of his senior advisors as well as people from the United Nations and Monsanto Company there – the idea there is to allow the testing of the transgenic genes for drought-tolerant corn into Tanzania through the system. And because of the politics of it, this had to be dealt at the presidential level, and he gave the go-ahead. And I think now we know this will be able to be tested and appropriated into the local lines of maize there. So this is going on, again, well.

Now, the community scale – and this is my favorite one. The Millennial Villages started with two villages, one in late 2004 and one in early 2005, as proof of concept. What happens if we put in together all the recommendations of the U.N. Millennium Project – put them to work? So one started in Sauri Sublocation in Siaya District in Western Kenya and the other one in Koraro Tabia in Northern Ethiopia.

The recommendations are serious. The recommended level of investment to achieve all the Millennium Development Goals, not only hunger but everything else, is a hundred in U.S. dollars per capita per year, of which ten dollars are from the household as labor; thirty dollars from the government, about three times as much as they're probably spending now in things like healthcare and extension services; and the rest, seventy dollars are going to be from the donors, us, the rich world, the five billion rich people versus the one billion poor, absolutely poor, people. And even there are some guidelines there. Agricultural nutrition get 15 percent, health 30, internal infrastructure 20, education 20, water, sanitation and other ones 15 percent. So that has been put to work.

What used to be two villages – and this pretty much what I reported last year here – it has expanded to 78 villages located in 12 sites, each site representing a major agroecological zone where the hunger hotspots are in Sub-Saharan Africa. They are in ten countries, and 76 villages of 5,000 people apiece or something in the order of working with about 400,000 people. If any of you want a copy of that map, I've got a few extras over here.

The villages are led by science coordinators, young Africans with PhDs, and they're also managed by health coordinators and education coordinators and infrastructure coordinators. It's based on a very simple paradigm: the community leads and it's science-based. And both go together.

The first village in February 2005, they weren't really, they got organized and were waiting for this, but they didn't believe it until that truck full of fertilizer arrived and that hybrid seed arrived. And the crop looked like it was something out of Oklahoma. And you can see what happened where this didn't happen.

Targeted subsidies are happening. Food production increased 3.5 times that first year. In Ethiopia it increased 8.4 times or 840%. In Rwanda, which was extremely low, both production and yields, extremely low, it increased 67 times. In Malawi it increased 11.4 times, reaching yields of almost about 5 tons per hectare in many areas, almost a hundred bushels per acre.

Right now there are 120,000 people in Africa now that for the first time they are no longer hungry and they have enough to eat. They have enough to feed their children, school, and they're getting into the market because they have a surplus.

I'll skip some of these reasons but go into this one. The key is: What do you do with that surplus. So cereal banks, promoted by the Rockefeller Foundation, are being used. Agrodealers, microfinance and crop insurance have to go all the way. On a small-scale water management, flour mills are going. The interesting thing is the clinics. The villages build the clinics in six weeks for less than \$10,000. Now they're all equipped, everybody is sleeping under their malaria bed nets. This situation of a child dying of malaria doesn't happen there anymore. Homegrown school feeding programs are going, energy interventions – big problem with water in some of them. Village truck to take things to market, working at the policy level to try to fix this road, so it was fixed after a meeting with the prime minister. And the transformation from subsistence to small-scale entrepreneurs is the key – and that's beginning to happen.



I'm going to quickly revise the old Confucius proverb, *Give people a fish and they will eat for a day* – that's dependency, food aid, certainly needed for the starvation situations – *Show them how to fish and they will eat for a lifetime* – that's empowerment, hunger elimination, and they'll buy fishing equipment. I'm a fisherman. That means you get into trade.

Now, I think the plane has taken off after surmounting all sorts of obstacles. And, Calestous, this is not a fake picture like yours, this is a real one. Somehow people have been able to get into that plane in spite of the lines in the shade there. And who is the pilot of that plane? The African woman farmer. Who is the copilot of that plane? Presidents and prime ministers of countries that are really committed, like President Kagame of Rwanda, President Touré from Mali, people like that. Who are the flight engineers? There are a lot of us present here. Who are the flight attendants? There are a lot of us here who are flight attendants. It's a better airplane because there is less corruption and better governance, so the plane is better built. Who gives the fuel to that plane? The private sector and philanthropy is what's fueling it. What kind of food do you eat on the plane? Locally produced food from African farms. Who are the frequent flyers? Many people here and elsewhere.

And perhaps more important – Who of you have not bought your tickets or have your boarding passes into this plane? The plane has taken off. The tipping point is off.

I apologize for taking a bit more time. But thank you very much.

---

## **Gordon Conway**

---

Thank you, Pedro. I'm afraid it means we've got no time now for questions and answers. And I'm going to hand over to Per, though, to introduce the two further speakers. And then with luck we'll have our discussion at the end of the session. But maybe Bob and Hans would come up onto the stage while Pedro is walking forward and the three of you perhaps would like to go down and then come back again towards the end.

Per needs no introduction. I was told not to introduce him, but he's my very good friend.